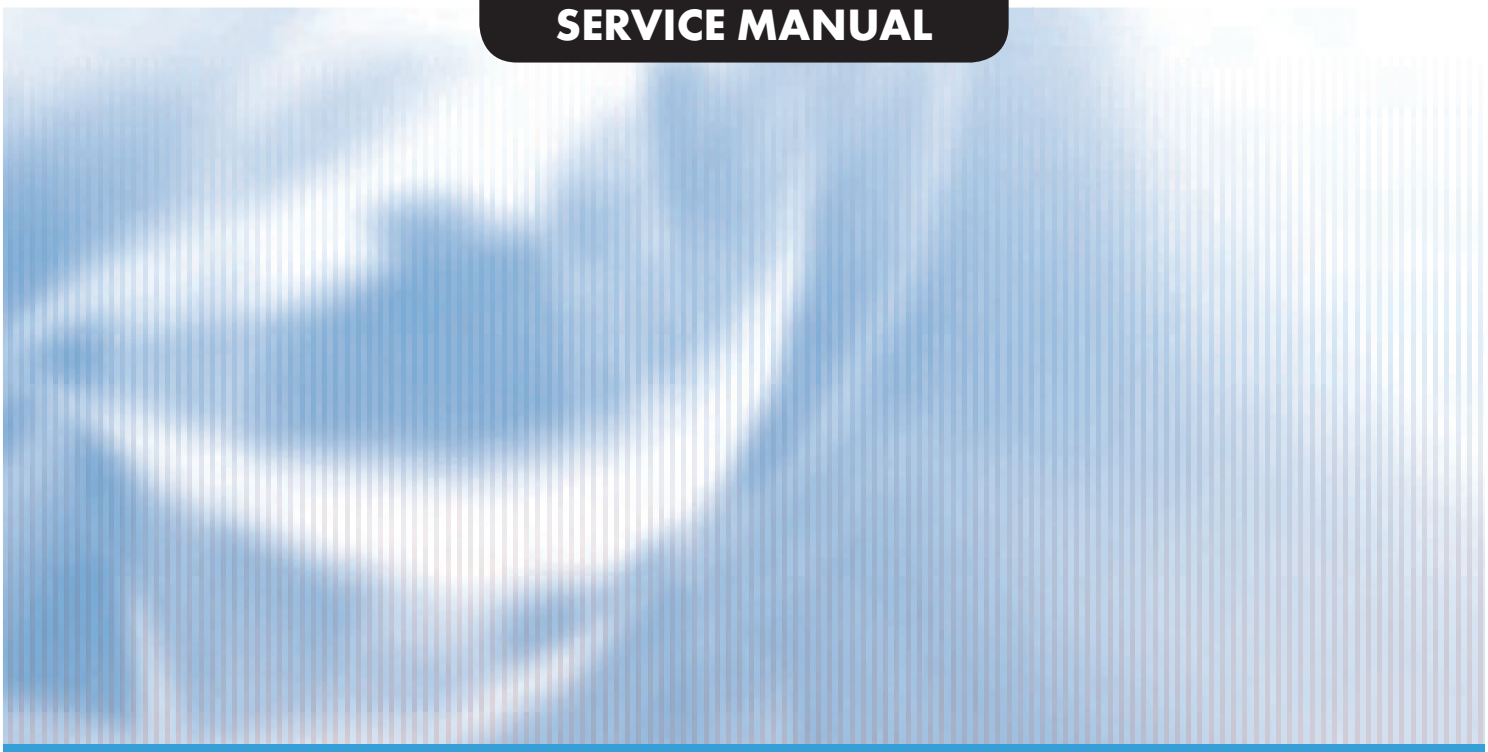
SERVICE MANUAL



ELEMENT SERIE

ASH-09AIE2, ASH-12AIE2

sinclair
AIR CONDITIONING

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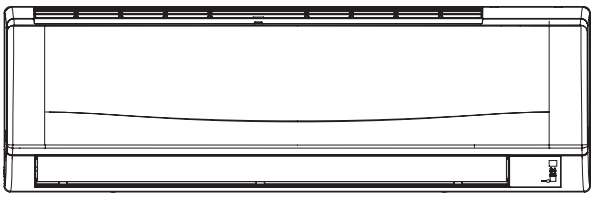
Part Ⅰ : Technical Information

1. Summary

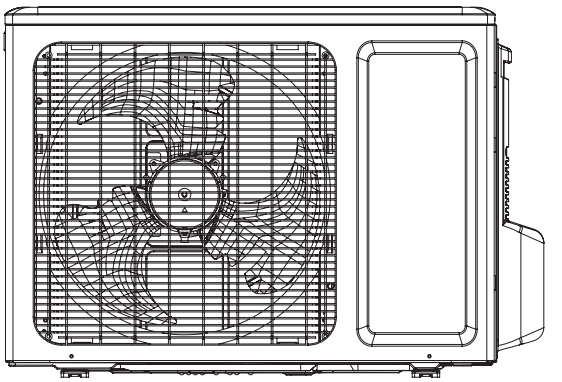
Indoor Unit:

ASH-09AIE2
ASH-12AIE2



Outdoor Unit

ASH-09AIE2
ASH-12AIE2



Remote Controller

YAA1FB

2. Specifications

2.1 Specification Sheet

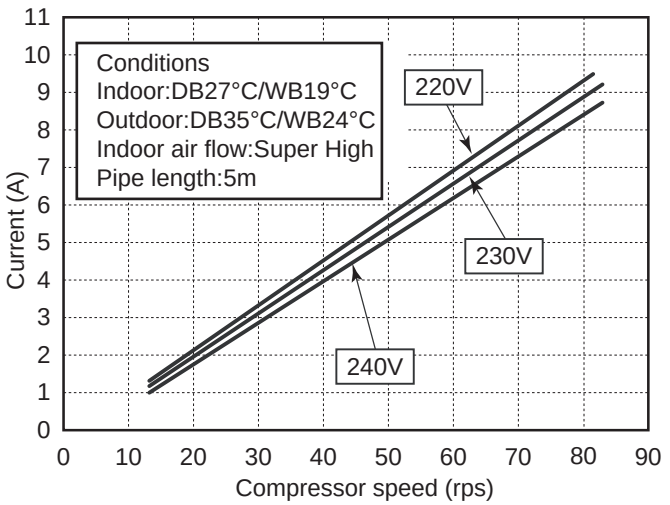
Model			ASH-09AIE2	ASH-12AIE2
Product Code			CB146038401_L31222	CB146038501_L31222
Power Supply	Rated Voltage	V~	220-240	220-240
	Rated Frequency	Hz	50	50
	Phases		1	1
Power Supply Mode			Outdoor	Outdoor
Cooling Capacity(Min~Max)		W	2600(450~3230)	3500(450~3230)
Heating Capacity(Min~Max)		W	2800(450~4100)	3800(450~4100)
Cooling Power Input(Min~Max)		W	870(200~1420)	1150(200~1420)
Heating Power Input(Min~Max)		W	900(200~1550)	1100(200~1550)
Cooling Current Input		A	3.8	5.1
Heating Current Input		A	4.0	4.9
Rated Input		W	1550	1650
Rated Cooling Current		A	6.3	6.9
Rated Heating Current		A	6.9	7.3
Air Flow Volume (SH/H/M/L)		m^3/h	600/520/370/280	680/560/410/300
Dehumidifying Volume		L/h	0.8	1.4
EER		W/W	2.99	3.04
COP		W/W	3.11	3.45
SEER			5.6	5.6
SCOP			/	/
Application Area		m^2	12-18	16-24
Indoor Unit	Indoor Unit Model		ASH-09AIE2	ASH-12AIE2
	Indoor Unit Product Code		CB146N38400_L31222	CB146N38500_L31222
	Indoor Unit Fan Type		Cross-flow	Cross-flow
	Indoor Unit Fan Diameter Length(DXL)	mm	Φ92X596	Φ92X596
	Cooling Speed (SH/H/M/L)	r/min	1350/1100/900/700	1350/1150/950/750
	Heating Speed (SH/H/M/L)	r/min	1350/1140/980/820	1350/1190/1020/850
	Indoor Unit Fan Motor Power Output	W	10	10
	Indoor Unit Fan Motor RLA	A	0.18	0.18
	Indoor Unit Fan Motor Capacitor	μF	1.2	1.2
	Evaporator Form		Aluminum Fin-copper Tube	Aluminum Fin-copper Tube
	Evaporator Pipe Diameter	mm	Φ7	Φ7
	Evaporator Row-fin Gap	mm	2-1.4	2-1.4
	Evaporator Coil Length (LXDXW)	mm	610X24X294	610X24X294
	Swing Motor Model		MP24BA	MP24BA
	Swing Motor Power Output	W	1.5	1.5
	Fuse Current	A	3.15	3.15
	Indoor Unit Sound Pressure Level (SH/H/M/L)	dB (A)	41/38/30/24	42/39/31/25
	Indoor Unit Sound Power Level (SH/H/M/L)	dB (A)	55/52/44/38	56/53/45/39
	Indoor Unit Dimension (WXHXD)	mm	770X283X201	770X283X201
	Indoor Unit Dimension of Carton Box (LXWXH)	mm	844X342X261	844X342X261
	Indoor Unit Dimension of Package (LXWXH)	mm	847X345X276	847X345X276
	Indoor Unit Net Weight	kg	8	9
	Indoor Unit Gross Weight	kg	9.5	10.5

Outdoor Unit	Outdoor Unit Model		ASH-09AIE2	ASH-12AIE2
	Outdoor Unit Product Code		CB146W36201_L31222	CB146W36101_L31222
	Compressor Manufacturer		ZHUHAI LANDA COMPRESSOR CO.,LTD.	ZHUHAI LANDA COMPRESSOR CO.,LTD.
	Compressor Model		QXA-A091zE190A	QXA-A091zE190A
	Compressor Oil		RB68EP	RB68EP
	Compressor Type		Rotary	Rotary
	Compressor Locked Rotor Amp (L.R.A)	A	20	20
	Compressor Rated Load Amp (RLA)	A	4.5	4.5
	Compressor Power Input	W	942	942
	Compressor Overload Protector		1NT11L-6233	1NT11L-6233
	Throttling Method		Electron expansion valve	Electron expansion valve
	Set Temperature Range	°C	16~30	16~30
	Cooling Operation Ambient Temperature Range	°C	-15~43	-15~43
	Heating Operation Ambient Temperature Range	°C	-20~24	-20~24
	Condenser Form		Aluminum Fin-copper Tube	Aluminum Fin-copper Tube
	Condenser Pipe Diameter	mm	Φ7	Φ7
	Condenser Rows-fin Gap	mm	1-1.4	2-1.4
	Condenser Coil Length (LXDXW)	mm	710X19.05X508	710X38.1X506
	Outdoor Unit Fan Motor Speed	rpm	900	900
	Outdoor Unit Fan Motor Power Output	W	30	30
	Outdoor Unit Fan Motor RLA	A	0.36	0.36
	Outdoor Unit Fan Motor Capacitor	μF	/	/
	Outdoor Unit Air Flow Volume	m^3/h	1600	1600
	Outdoor Unit Fan Type		Axial-flow	Axial-flow
	Outdoor Unit Fan Diameter	mm	Φ400	Φ400
	Defrosting Method		Automatic Defrosting	Automatic Defrosting
	Climate Type		T1	T1
	Isolation		I	I
	Moisture Protection		IP24	IP24
	Permissible Excessive Operating Pressure for the Discharge Side	MPa	4.3	4.3
	Permissible Excessive Operating Pressure for the Suction Side	MPa	2.5	2.5
	Outdoor Unit Sound Pressure Level (H/M/L)	dB (A)	51/-/-	53/-/-
	Outdoor Unit Sound Power Level (H/M/L)	dB (A)	62/-/-	63/-/-
	Outdoor Unit Dimension (WXHXD)	mm	776X540X320	776X540X320
	Outdoor Unit Dimension of Carton Box (LXWXH)	mm	848X360X580	848X360X580
	Outdoor Unit Dimension of Package (LXWXH)	mm	851X363X595	851X363X595
	Outdoor Unit Net Weight	kg	28	29
	Outdoor Unit Gross Weight	kg	31	32
	Refrigerant		R410A	R410A
	Refrigerant Charge	kg	0.7	0.85
Connection Pipe	Connection Pipe Length	m	5	5
	Connection Pipe Gas Additional Charge	g/m	20	20
	Outer Diameter of Liquid Pipe	mm	Φ6	Φ6
	Outer Diameter of Gas Pipe	mm	Φ9.52	Φ9.52
	Max Distance Height	m	10	10
	Max Distance Length	m	15	20
	Note: The connection pipe applies metric diameter.			

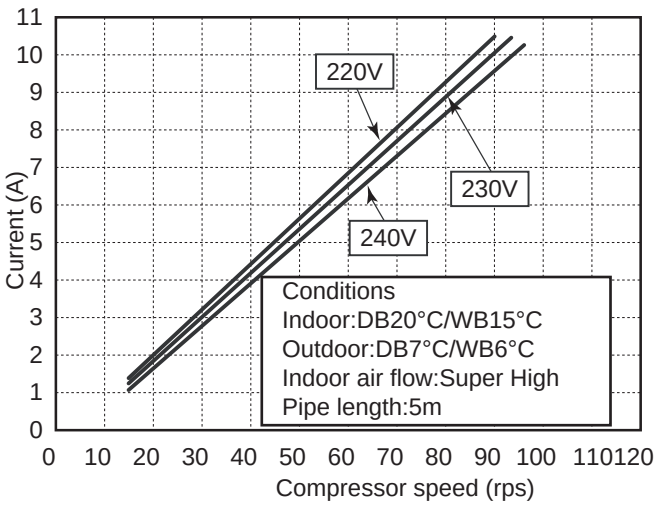
The above data is subject to change without notice; please refer to the nameplate of the unit.

2.2 Operation Characteristic Curve

Cooling

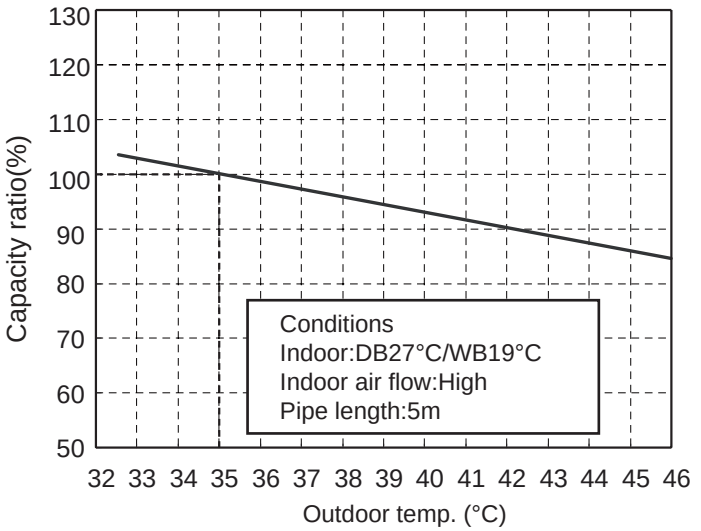


Heating

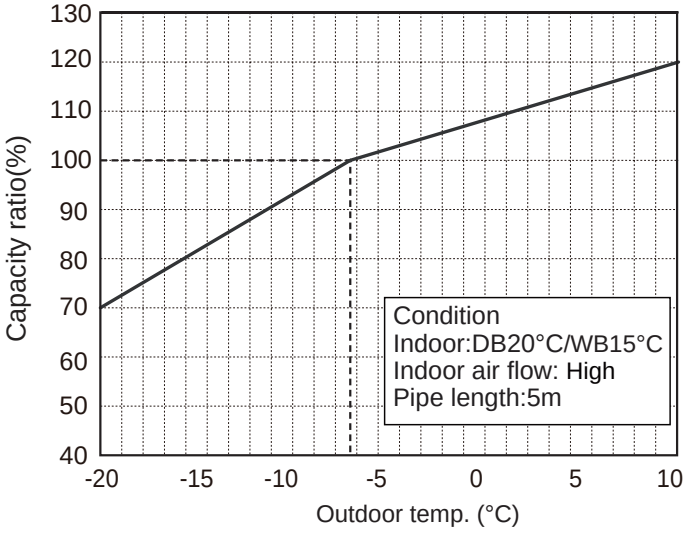


2.3 Capacity Variation Ratio According to Temperature

Cooling



Heating



2.4 Cooling and Heating Data Sheet in Rated Frequency

Cooling:

Rated cooling condition(°C) (DB/WB)		Model	Pressure of gas pipe connecting indoor and outdoor unit	Inlet and outlet pipe temperature of heat exchanger		Fan speed of indoor unit	Fan speed of outdoor unit	Compressor revolution (rps)
Indoor	Outdoor		P (MPa)	T1 (°C)	T2 (°C)			
27/19	35/24	ASH-09AIE2	0.9 to 1.1	12 to 14	75 to 37	Super High	High	63
		ASH-12AIE2	0.8 to 1.0	10 to 12	85 to 43	Super High	High	70

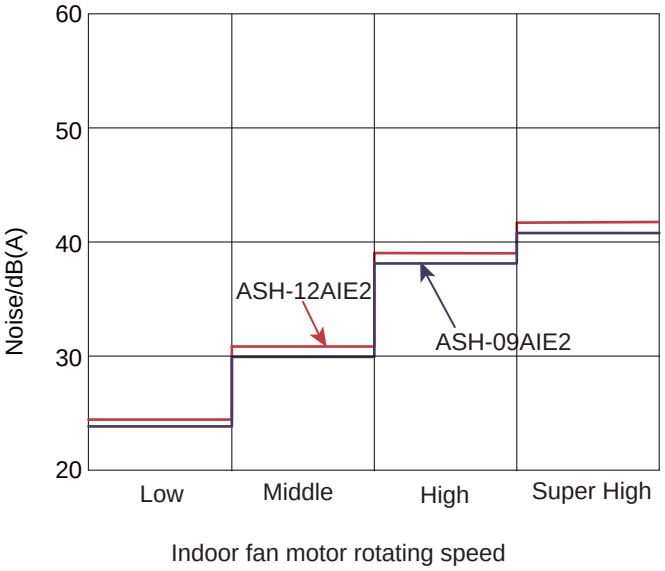
Heating:

Rated heating condition(°C) (DB/WB)		Model	Pressure of gas pipe connecting indoor and outdoor unit	Inlet and outlet pipe temperature of heat exchanger		Fan speed of indoor unit	Fan speed of outdoor unit	Compressor revolution (rps)
Indoor	Outdoor		P (MPa)	T1 (°C)	T2 (°C)			
20/15	7/6	ASH-09AIE2	2.4 to 2.6	70 to 35	2 to 4	Super High	High	69
		ASH-12AIE2	2.4 to 2.6	70 to 35	2 to 4	Super High	High	72

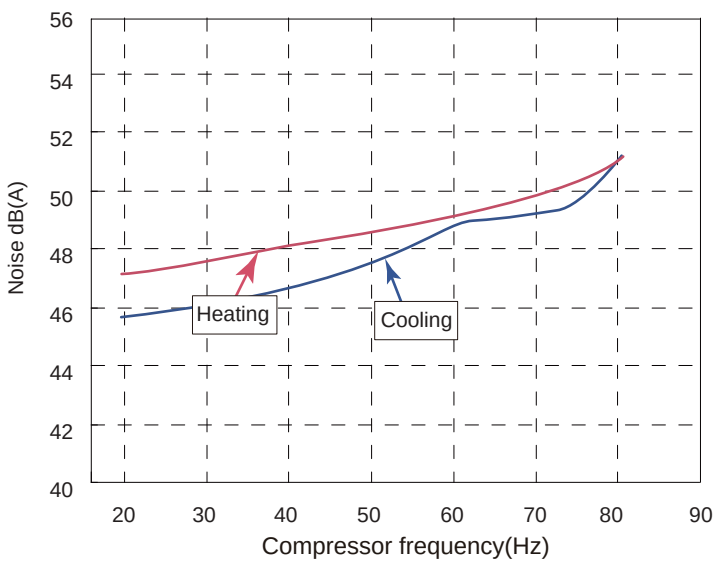
Instruction:
T1: Inlet and outlet pipe temperature of evaporator
T2: Inlet and outlet pipe temperature of condenser
P: Pressure at the side of big valve
Connection pipe length:5 m.

2.5 Noise Curve

Indoor side noise when blowing

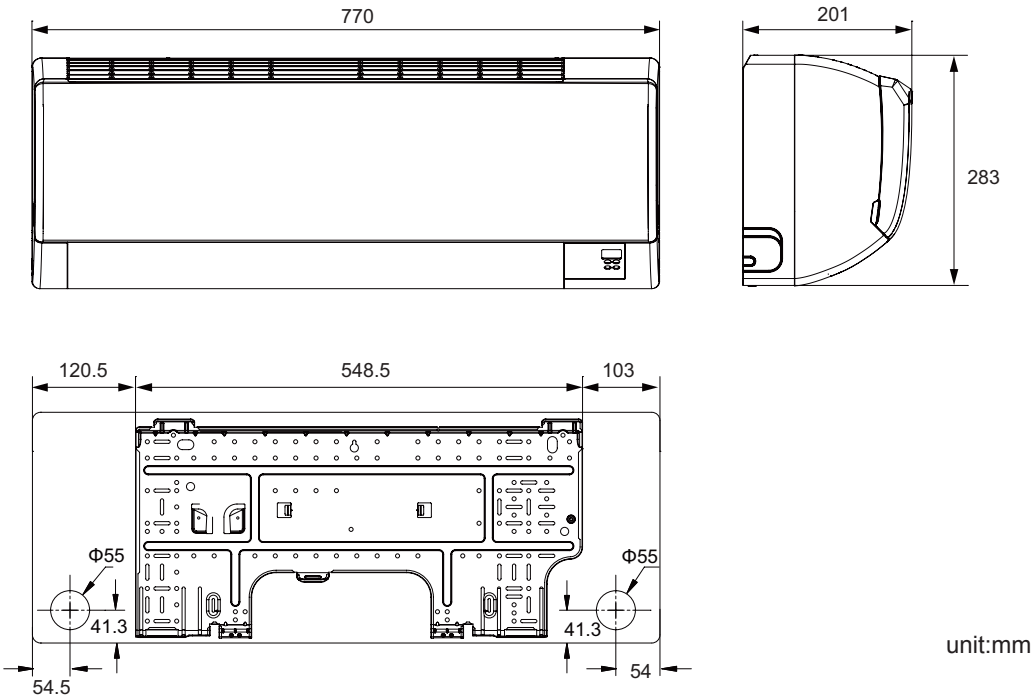


Outdoor side noise when blowing



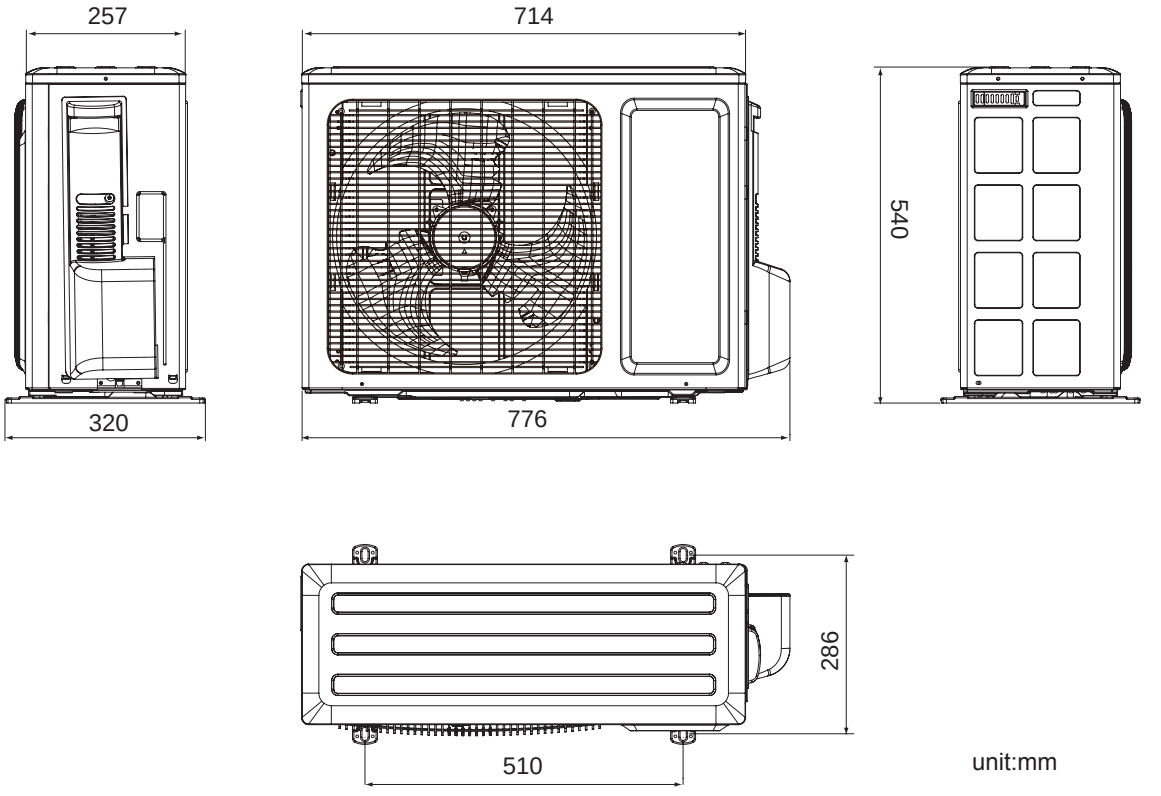
3. Outline Dimension Diagram

3.1 Indoor Unit



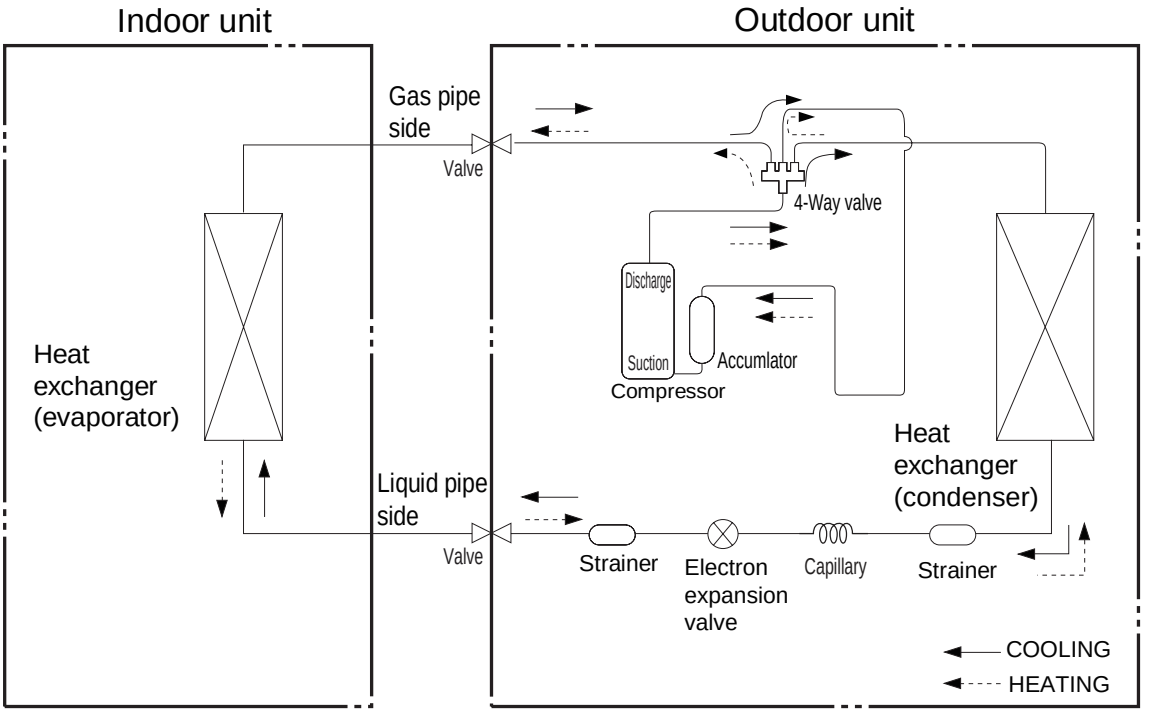
unit:mm

3.2 Outdoor Unit



unit:mm

4. Refrigerant System Diagram



Connection pipe specification:
Liquid pipe:1/4" (6mm)
Gas pipe:3/8" (9.52mm)

5. Electrical Part

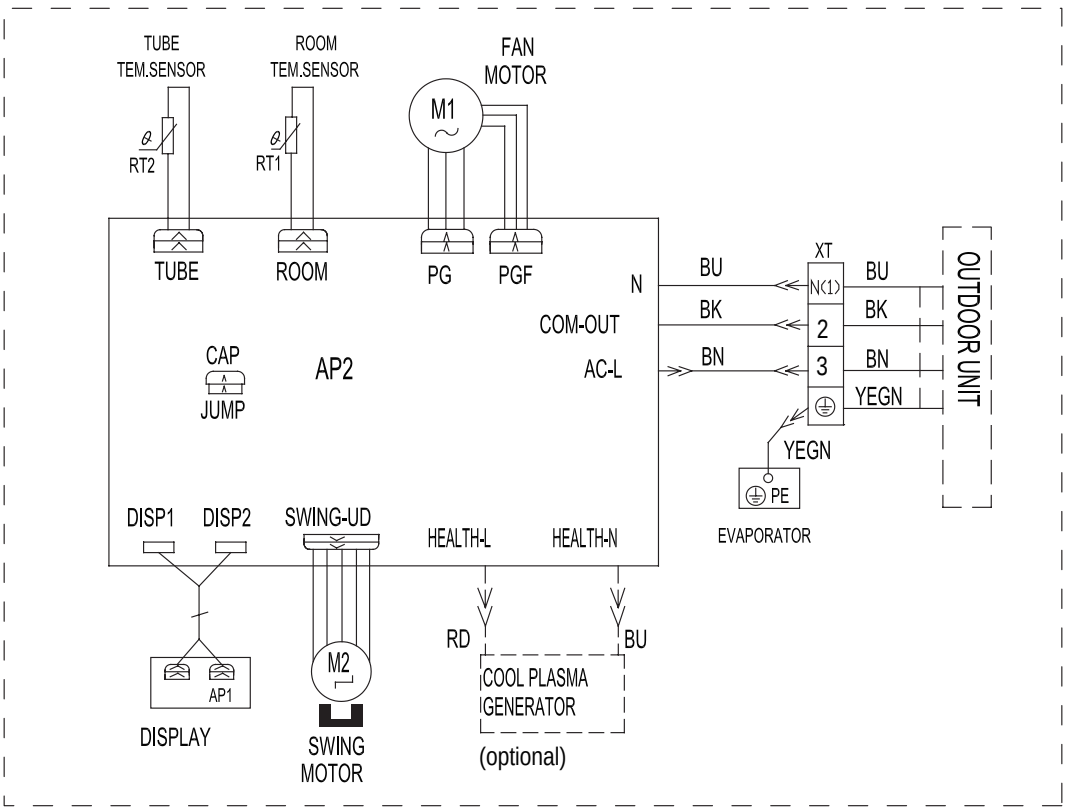
5.1 Wiring Diagram

● Instruction

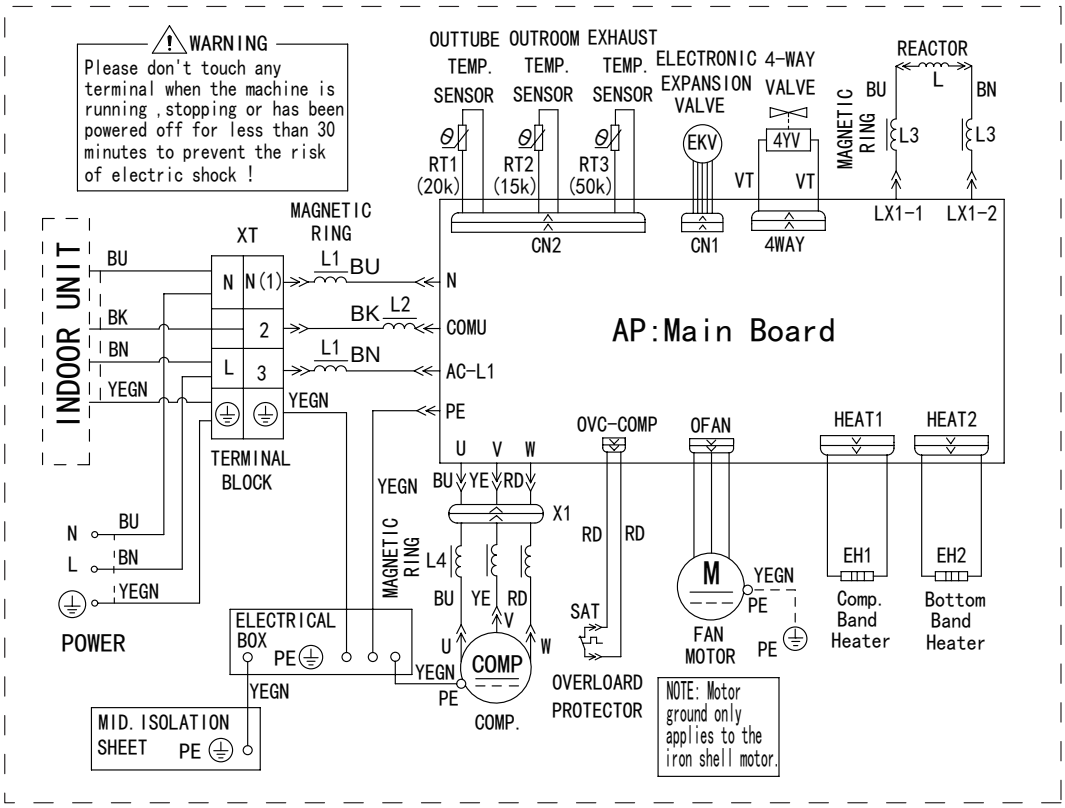
Symbol	Symbol Color	Symbol	Symbol Color	Symbol	Name
WH	White	GN	Green	CAP	Jumper cap
YE	Yellow	BN	Brown	COMP	Compressor
RD	Red	BU	Blue	⏚	Grounding wire
YEGN	Yellow/Green	BK	Black	/	/
VT	Violet	OG	Orange	/	/

Note: Jumper cap is used to determine fan speed and the swing angle of horizontal lover for this model.

● Indoor Unit



● Outdoor Unit

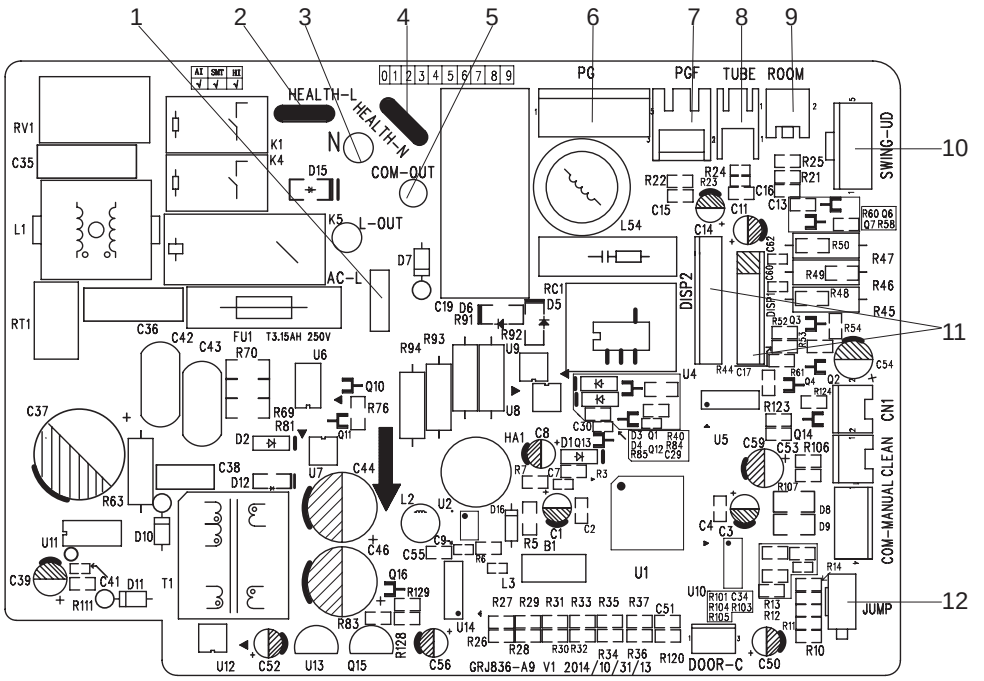


These wiring diagrams are subject to change without notice; please refer to the one supplied with the unit.

5.2 PCB Printed Diagram

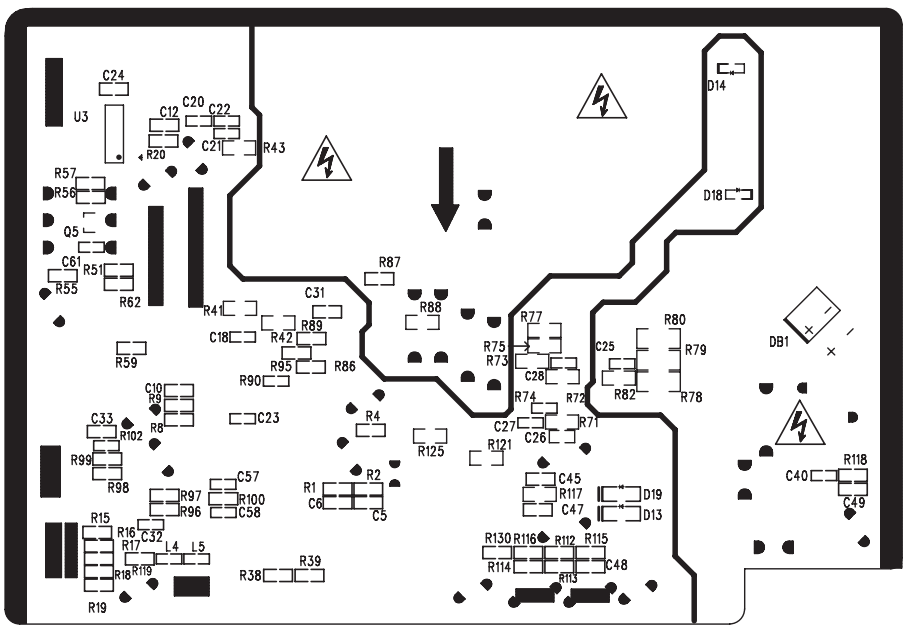
Indoor Unit

●TOP VIEW



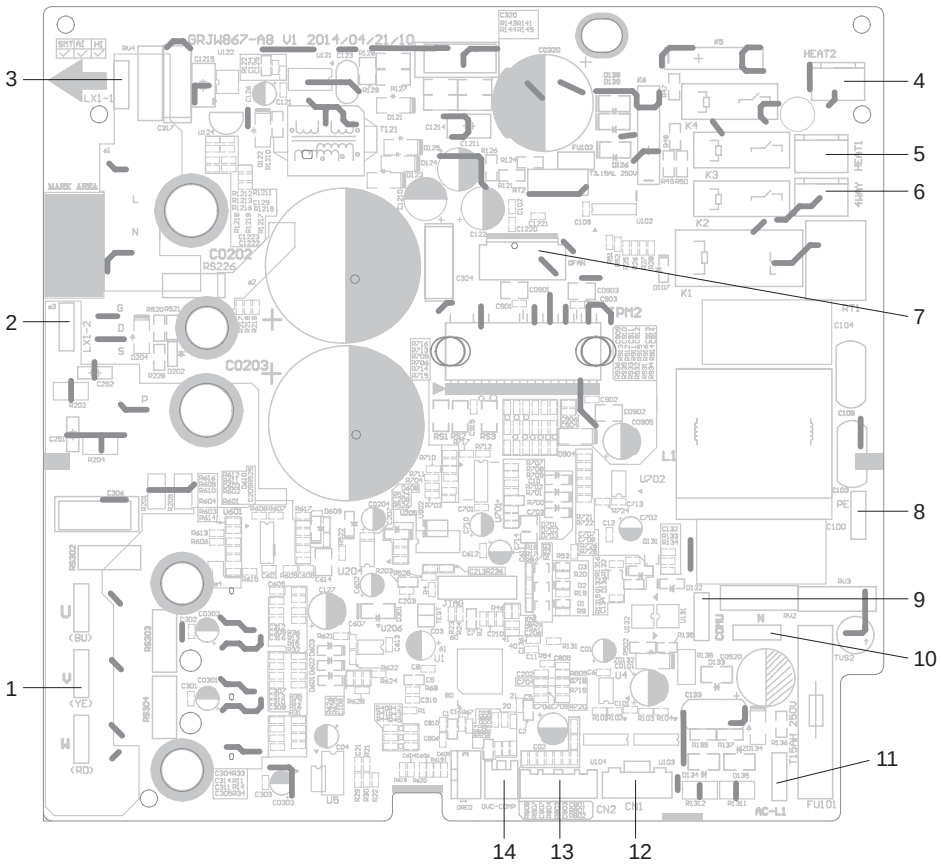
No.	Name
1	Interface of live wire
2	Interface of live wire for health function
3	Interface of neutral wire
4	Interface of neutral wire for health function
5	Interface of neutral wire and live wire communication
6	Control interface of PG motor
7	Feedback interface of indoor fan
8	Indoor tube temperature sensor interface
9	Ambient temperature sensor interface
10	Up & down swing
11	Interface of display
12	Jumper cap

●BOTTOM VIEW



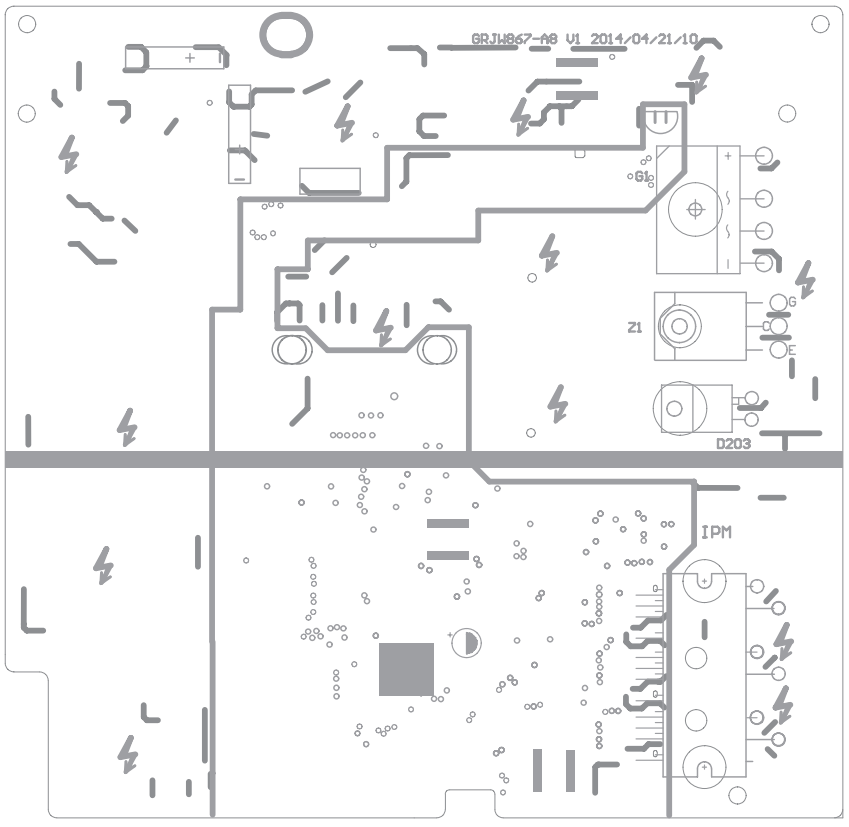
Outdoor Unit

●TOP VIEW



No.	Name
1	Compressor
2	Reactor 2
3	Reactor 1
4	Chassis electric heating
5	Compressor electric heating
6	4-way valve
7	DC fan
8	Earthing wire
9	Communication wire
10	Neutral wire
11	Live wire
12	Electronic expansion valve
13	Temperature sensor
14	Overload

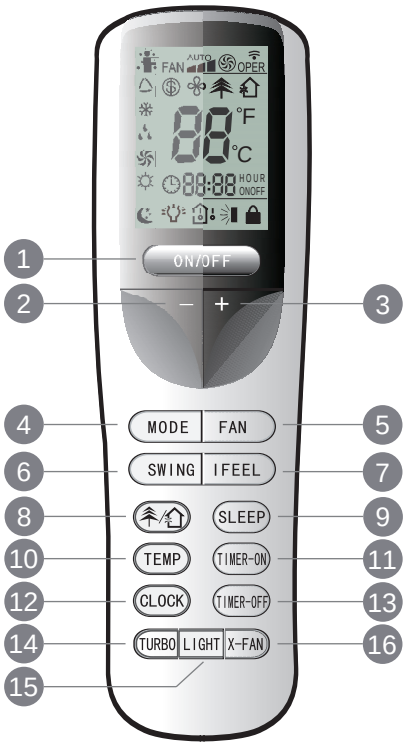
●BOTTOM VIEW



6. Function and Control

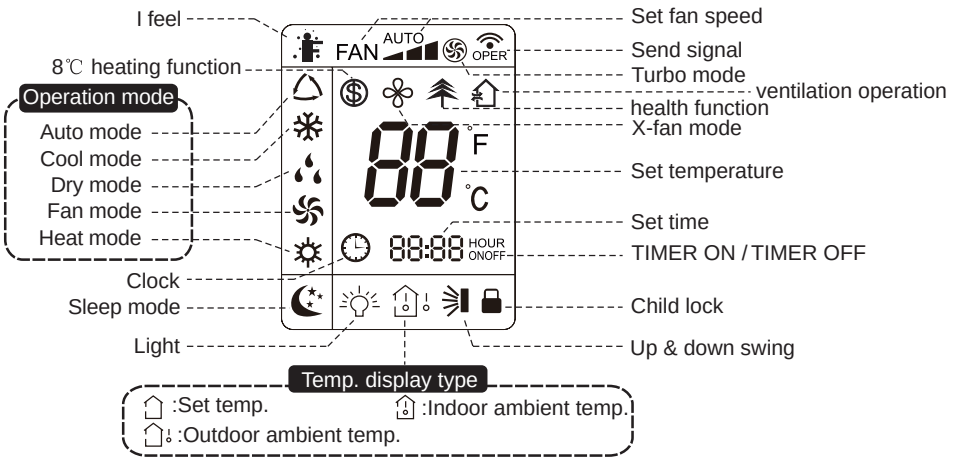
6.1 Remote Controller Introduction

Buttons on Remote Controller



1. ON/OFF button
2. - button
3. + button
4. MODE button
5. FAN button
6. SWING button
7. I FEEL button
8. / button
9. SLEEP button
10. TEMP button
11. TIMER-ON button
12. CLOCK button
13. TIMER-OFF button
14. TURBO button
15. LIGHT button
16. X-FAN button

Introduction for Icons on Display Screen



Introduction for Buttons on Remote Controller

Note:

● After putting through the power, the air conditioner will give out a sound. Operation indictor " " is ON (red indicator). After that, you can operate the air conditioner by using remote controller.

● Under on status, pressing the button on the remote controller, the signal icon " "on the display of remote controller will blink once and the air conditioner will give out a “de” sound, which means the signal has been sent to the air conditioner.

● Under off status, set temperature and clock icon will be displayed on the display of remote controller (If timer on, timer off and light functions are set, the corresponding icons will be displayed on the display of remote controller at the same time); Under on status, the display will show the corresponding set function icons.

1. ON/OFF Button

Press this button to turn on the unit. Press this button again to turn off the unit.

2. - Button

Press this button to decrease set temperature. Holding it down above 2 seconds rapidly decreases set temperature. In AUTO mode, set temperature is not adjustable.

3. + Button

Press this button to increase set temperature. Holding it down above 2 seconds rapidly increases set temperature. In AUTO mode, set temperature is not adjustable.

4. MODE Button

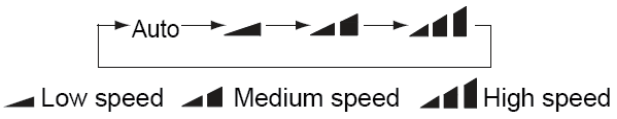
Each time you press this button, a mode is selected in a sequence that goes from AUTO, COOL, DRY, FAN, and HEAT*, as the following:

*Note:Only for models with heating function.

After energization, AUTO mode is defaulted. In AUTO mode, the set temperature will not be displayed on the LCD, and the unit will automatically select the suitable operation mode in accordance with the room temperature to make indoor room comfortable.
(As for cooling only unit, it won't have any action when it receives the signal of heating operation.)

5. FAN Button

This button is used for setting Fan Speed in the sequence that goes from AUTO, , to , then back to Auto.



6. SWING Button

Press this button to set up &down swing angle, which circularly changes as below:

This remote controller is universal. If any command , or is sent out, the unit will carry out the command as indicates the guide louver swings as:

7. I FEEL Button

Press this button to turn on I FEEL function. The unit automatically adjust temperature according to the sensed temperature. Press this button again to cancel I FEEL function.

8. / Button

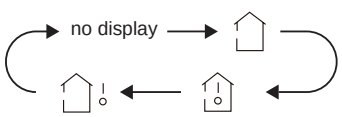
Press this button to achieve the on and off of healthy and scavenging functions in operation status. Press this button for the first time to start scavenging function; LCD displays "". Press the button for the second time to start healthy and scavenging functions simultaneously; LCD displays "" and "". Press this button for the third time to quit healthy and scavenging functions simultaneously. Press the button for the fourth time to start healthy function; LCD display "". Press this button again to repeat the operation above. (This function is applicable to partial of models)

9. SLEEP Button

Press this button to go into the SLEEP operation mode. Press it again to cancel this function. This function is available in COOL, HEAT (Only for models with heating function) mode to maintain the most comfortable temperature for you.

10. TEMP Button

Press this button can see indoor set temperature, indoor ambient temperature or outdoor ambient temperature on indoor unit's display. Temperature is set circularly by remote controller as below:



When selecting " " by remote controller or no display, temperature indicator on indoor unit displays set temperature.

When selecting " " by remote controller, temperature indicator on indoor unit displays indoor ambient temperature.

When selecting " " by remote controller, temperature indicator on indoor unit displays outdoor ambient temperature.

Outdoor ambient temperature display may can't be selected for some models.When indoor unit receives " " signal, it displays indoor set temperature.

Only for the model whose indoor unit has dual-8 display.

11. TIMER-ON Button

Press this button to initiate the auto-ON timer. To cancel the auto-timer program, simply press this button again.

After press of this button, disappears and "ON" blinks. 00:00 is displayed for ON time setting. Within 5 seconds, press + or - button to adjust the time value. Every press of either button changes the time setting by 1 minute. Holding down either button rapidly changes the time setting by 1 minute and then 10 minutes. Within 5 Seconds after setting,press TIMER ON button to confirm.

12. CLOCK Button

Press CLOCK button,blinking. Within 5 seconds, pressing + or - button adjusts the present time. Holding down either button above 2 seconds increases or decreases the time by 1 minute every 0.5 second and then by 10 minutes every 0.5 second. During blinking after setting, press CLOCK button again to confirm the setting, and then will be constantly displayed.

13. TIMER-OFF Button

Press this button to initiate the auto-off timer. To cancel the auto-timer program, simply press the button again. TIMER OFF setting is the same as TIMER ON.

14. TURBO Button

Press this button to activate / deactivate the Turbo function which enables the unit to reach the preset temperature in the shortest time. In COOL mode, the unit will blow strong cooling air at super high fan speed. In HEAT mode, the unit will blow strong heating air at super high fan speed.

15. LIGHT Button

Press LIGHT button to turn on the display's light and press this button again to turn off the display's light. If the light is turned on, is displayed. If the light is turned off, disappears.

16. X-FAN Button

Pressing X-FAN button in COOL or DRY mode, the icon is displayed and the indoor fan will continue operation for 2 minutes in order to dry the indoor unit even though you have turned off the unit.

After energization, X-FAN OFF is defaulted. X-FAN is not available in AUTO, FAN or HEAT mode.

Combination of "+" and "-" buttons: About lock

Press "+" and "-" buttons simultaneously to lock or unlock the keypad. If the remote controller is locked, is displayed. In this case, pressing any button, blinks three times.

Combination of "MODE" and "-" buttons:About switch between Fahrenheit and centigrade

At unit OFF, press "MODE" and "-" buttons simultaneously to switch between °C and °F.

Combination of "TEMP" and "CLOCK" buttons:About Energy-saving Function

Press "TEMP" and "CLOCK" simultaneously in COOL mode to start energy-saving function.Nixie tube on the remote controller displays "SE". Repeat the operation to quit the function.

Combination of "TEMP" and "CLOCK" buttons:About 8°C Heating Function

Press "TEMP" and "CLOCK" simultaneously in HEAT mode to start 8°C Heating Function Nixie tube on the remote controller displays " " and a selected temperature of "8°C".(46°F if Fahrenheit is adopted). Repeat the operation to quit the function.

About Back-lighting Function

The unit lights for 4s when energizing for the first time, and 3s for later press.

About HEALTH function (COLD PLASMA)

Turn on the unit, start up the fan (Breezing and X-FAN are excluded) and press HEATLTH button on remote controller to start health function (If there is not HEALTH button on remote controller, the unit defaults health function ON.)

Operation guide

1. After putting through the power, press "ON/OFF" button on remote controller to turn on the air conditioner.
2. Press "MODE" button to select your required mode: AUTO, COOL, DRY, FAN,HEAT.
3. Press "+" or "-" button to set your required temperature. (Temperature can't be adjusted under auto mode).
4. Press "FAN" button to set your required fan speed: auto, low, medium and high speed.
5. Press "SWING" button to select fan blowing angle.

Replacement of Batteries in Remote Controller

1.Press the back side of remote controller marked with“ OPEN ”as shown in the fig, and then push out the cover of battery box along the arrow direction.

2. Replace two 7# (AAA 1.5V) dry batteries, and make sure the position of “+” polar and “-“ polar are correct.

3. Reinstall the cover of battery box.

Note:

● During operation, point the remote control signal sender at the receiving window on indoor unit.

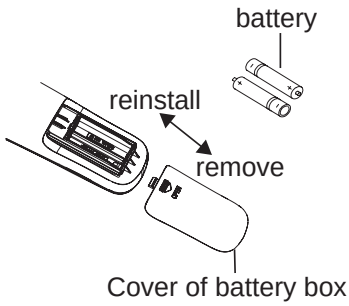
● The distance between signal sender and receiving window should be no more than 8m, and there should be no obstacles between them.

● Signal may be interfered easily in the room where there is fluorescent lamp or wireless telephone; remote controller should be close to indoor unit during operation.

● Replace new batteries of the same model when replacement is required.

● When you don’t use remote controller for a long time, please take out the batteries.

● If the display on remote controller is fuzzy or there’s no display, please replace batteries.



6.2 Brief Description of Modes and Functions

1.Temperature Parameters

●Indoor preset temperature (Tpreset)

●Indoor ambient temperature (Tamb.)

2. Basic Functions

Once energized, in no case should the compressor be restarted within less than 3 minutes. In the situation that memory function is available, for the first energization, if the compressor is at stop before de-energization, the compressor will be started without a 3-minute lag; if the compressor is in operation before de-energization, the compressor will be started with a 3-minute lag; and once started, the compressor will not be stopped within 6 minutes regardless of changes in room temperature;

(1)COOL mode

① The condition and process of cooling

If Tamb≥Tpreset COOL mode will act, the compressor and outdoor fan will run, and the indoor fan will run at the set speed.

If Tamb≤Tpreset-2°C, the compressor will stop, the outdoor fan will delay 30 seconds to stop, and the indoor fan will run at the set speed. If Tpreset-2°C≤Tamb ≤Tpreset , the unit will keep running in the previous mode. In this mode, the reversal valve will not be powered on and the temperature setting range is 16 ~30°C.

② Protection function

●Overcurrent protection

If total current is high, the compressor will run in limited frequency. If total current is too high, the compressor will stop, the outdoor fan will delay 30 seconds to stop, indoor unit will display E5 and outdoor yellow light will blink 5 times.

●Antifreezing protection

When the antifreezing protection is detected, the compressor will stop, the outdoor fan will stop after 30 seconds, and the indoor fan and swing motor will keep running in the original mode. When antifreezing protection is eliminated and the compressor has stopped for 3 minutes, the compressor will resume running in the original mode.

(2) Dehumidifying mode

① Working conditions and process of dehumidifying

If Tamb.>Tpreset, the unit will enter cooling and dehumidifying mode, in which case the compressor and the outdoor fan will operate and the indoor fan will run at low speed.

If Tpreset -2°C≤Tamb.≤Tpreset, the compressor remains at its original operation state.

If Tamb.< Tpreset -2°C, the compressor will stop, the outdoor fan will stop with a time lag of 30s, and the indoor fan will operate at low speed.

② Protection function

Protection is the same as that under the cooling mode.

(3) HEAT mode

① The condition and process of heating

If Tamb≤Tpreset+2°C, HEAT mode will act, the compressor, outdoor fan and reversal valve will run, the indoor fan will delay 3min to stop at the latest.

If Tpreset +2°C≤Tamb≤Tpreset +5°C,the unit will keep running in the original mode.

If Tamb≥Tpreset +5°C, the compressor will stop, the outdoor fan will delay 30sec to stop and indoor fan will blow 60S at low speed, the fan speed cannot be shifted within blow residual heat.

●In this mode, the temperature setting range is 16 ~30°C.

●The air conditioner will adjust the running frequency of the compressor automatically according to the change of ambient temperature.

●When the unit is turned off in HEAT mode, or switched to other mode from HEAT mode, the four-way valve will be powered off after the compressor stops.

② The condition and process of defrosting

When frost is detected in the condenser, the system will enter into defrosting state. When defrosting starts, the compressor and indoor fan will stop, and the outdoor fan and four-way valve will delay 30 seconds to stop. The compressor will start after 15 seconds and then defrosting will be started. When the compressor has run for 7 minutes or defrosting is finished, the compressor will stop. After 30 seconds the four-way valve opens and after another 60 seconds, the compressor and outdoor fan resume running. The indoor fan will delay 3 minutes to run at the latest and heating indicator on indoor unit OFF 0.5s and ON 10s.

③ Protection function

●Anti-cold-wind protection

In HEAT mode, in order to prevent the indoor unit from blowing out cold wind, each time the compressor starts, the indoor fan will delay 3 minutes after the compressor to run at the latest and it can adjust fan speed automatically when temperature is low.

●Overcurrent protection

Overcurrent protection is the same with that in COOL mode.

●Cold air prevention

The unit is started under heating mode (the compressor is ON):

1.In the case of Tindoor amb. <24°C: if T≤tube40°C and the indoor fan is at stop state, the indoor fan will begin to run at low speed with a time lag of 2 minutes. Within 2 minutes, if Ttube>40°C, the indoor fan also will run at low speed; and after1-minute operation at low speed, the indoor fan will be converted tooperation at preset speed. Within 1-minute low speed operation or 2-minute non-operation, if Ttube>42°C, the fan will run at present speed.
2.In the case of Tindoor amb.≥24°C: if Ttube≤42°C, the indoor fan will run at low speed, and afterone minute, the indoorfan will be converted to preset speed. Within one-minute low speed operation, if Ttube>42°C, the indoor fan will beconvertedto preset speed.
Note:$T_{indoor\ amb.}$ indicated in 1 and 2 refers to, under initially heating mode, the indoor ambient temperature before the command to start the compressor is performed according to the program, or after the unit is withdrawn from defrost, the indoor ambient temperature before the defrost symbol is cleared.
●Total current up and frequency down protection
If the total current I_{total}≤W, frequency rise will be allowed; if I_{total}≥X, frequency rise will not be allowed; if I_{total}≥Y, the compressor will run at reduced frequency; and if I_{total}≥Z, the compressor will stop and the outdoor fan will stop with a time lag of 30s.

(4) Fan Mode

Under the mode, the indoor fan will run at preset speed and the compressor, the outdoor fan, the four-way valve and the electric heater will stop.
Under the mode, temperature can be set within a range of 16~30°C.

(5) AUTO Mode

① The condition and process of auto
a. When Tamb.≥26°C the unit will operate at Cooling mode. In that case, the set temperature will be 25°C.
b. When Tamb.≤22°C the heat pump unit will operate at Heating mode. In that case, the set temperature will be 20°C; the cooling-only unit will operate at Fan mode and the set temperature will be 25°C.
c. When 23°C≤Tamb.≤25°C the unit will keep its operation status but if it is firstly energized, the unit will operate at Fan mode.
d. When unit operates at Auto mode, the frequency of compressor will be the same as that in Cooling mode if the unit is coolingwhile it will be the same as that in the Heating mode if the unit is heating.
② Protection function
a.In cooling operation, protection is the same as that under the cooling mode;
b.In heating operation, protection is the same as that under the heating mode;
c.When ambient temperature changes, operation mode will be converted preferentially. Once started, the compressor will remain unchanged for at least 6 minutes.

(6) Common Protection Functions and Fault Display under COOL, HEAT, DRY and AUTO Modes

① Overload protection
Ttube: measured temperature of outdoor heat exchanger under cooling mode; and measured temperature of indoor heat exchanger under heating mode.
1) Cooling overload
a. If T tube52, the unit will return to its original operation state.
b. If T tube55, frequency rise is not allowed.
c. If T tube58, the compressor will run at reduced frequency.
d. If T tube62, the compressor will stop and the indoor fan will run at preset speed.
2) Heating overload
a. If T tube52, the unit will return to its original operation state.
b. If T tube55, frequency rise is not allowed.
c. If T tube58, the compressor will run at reduced frequency.
d. If T tube62, the compressor will stop and the indoor fan will blow residue heat and then stop.
② Exhaust temperature protection of compressor
If exhaust temperature 98, frequency is not allowed to rise.
If exhaust temperature 103, the compressor will run at reduced frequency.
If exhaust temperature 110, the compressor will stop.
If exhaust temperature 90 and the compressor has stayed at stop for at least 3 minutes, the compressor will resume its operation.
③ Communication fault
If the unit fails to receive correct signals for durative 3 minutes, communication fault can be justified and the whole system will stop.
④ Module protection
Under module protection mode, the compressor will stop. When the compressor remains at stop for at least 3 minutes, the compressor will resume its operation. If module protection occurs six times in succession, the compressor will not be started again.
⑤ Overload protection
If temperature sensed by the overload sensor is over 115, the compressor will stop and the outdoor fan will stop with a time lag of 30 seconds.
⑥ If temperature is below 95, the overload protection will be relieved. If voltage on the DC bus is below 150V or over 420V, the compressor will stop and the outdoor fan will stop with a time lag of 30 seconds. When voltage on the DC bus returns to its normal value and the compressor has stayed at stop for at least 3 minutes, the compressor will resume its operation.

3. Other Controls

(1) ON/OFF

Press the remote button ON/OFF: the on-off state will be changed once each time you press the button.

(2) Mode Selection

Press the remote button MODE, then select and show in the following ways: AUTO, COOL, DRY, FAN, HEAT, AUTO.

(3) Temperature Setting Option Button

Each time you press the remote button TEMP+ or TEMP-, the setting temperature will be up or down by 1°C. Regulating Range: 16~30°C, the button is useless under the AUTO mode.

(4) Time Switch

You should start and stop the machine according to the setting time by remote control.

(5) SLEEP State Control

① Cooling mode

a. When initial temperature setting is 16~23°C, after turning on sleep function, temperature will increase 1°C every one hour. After temperature is increased by 3°C, the unit will keep this temperature. After operation for 7 hours, temperature will decrease 1°C. After that, the unit will operate at this temperature all the time.

b. When initial temperature setting is 24~27°C, after turning on sleep function, temperature will increase 1°C every one hour. After temperature is increased by 2°C, the unit will keep this temperature. After operation for 7 hours, temperature will decrease 1°C. After that, the unit will operate at this temperature all the time.

c. When initial temperature setting is 28~29°C, after turning on sleep function, temperature will increase 1°C every one hour. After temperature is increased by 1°C, the unit will keep this temperature. After operation for 7 hours, temperature will decrease 1°C. After that, the unit will operate at this temperature all the time. When the initial temperature setting is 30°C, the unit will operate under this temperature. After operation for 7 hours, temperature will decrease 1°C. After that, the unit will operate at this temperature all the time.

② Heating mode:

a. When initial temperature setting is 16°C, the unit operate under this temperature all the time.

b. When initial temperature setting is 17~20°C, after turning on sleep function, temperature will decrease 1°C every one hour. After temperature is increased by 1°C, the unit will keep this temperature.

c. When initial temperature setting is 21~27°C, after turning on sleep function, temperature will decrease 1°C every one hour. After temperature is increased by 2°C, the unit will keep this temperature.

d. When initial temperature setting is 28~30°C, after turning on sleep function, temperature will decrease 1°C every one hour. After temperature is increased by 3°C, the unit will keep this temperature.

(6) Indoor Fan Control

Speed of indoor fan can be set as Turbo, High, Med., Low by remote control. In that case, fan will operate at super high, high, medium, or low speed accordingly. The fan speed can also be set at Auto, which is as follows:

① In heating mode: in auto heating or heating mode, the auto fan speed is as follows:

a. Tamb.≤Tpreset+1°C: indoor fan will operate at high speed;

b. Tpreset+1°C<Tamb.<Tpreset + 3°C: indoor fan will operate at med. speed;

c. Tamb.≥Tpreset + 3°C: indoor fan will operate at low speed; At least 210 seconds of operation shall be maintained for switchover between high and low speeds, med. and low speeds, and high and low speeds.

② In cooling mode, in auto cooling or cooling mode, the auto fan speed is as follows:

a. Tamb.≥Tpreset+2°C: indoor fan will operate at high speed.

b. Tpreset <Tamb.<Tpreset + 2°C: indoor fan will operate at med. speed;

c. Tamb.≤Tpreset: indoor fan will operate at low speed. At least 210 seconds of operation shall be maintained for switchover between high and low speeds, med. and low speeds, and high and low speeds.

(7) Buzzer Control

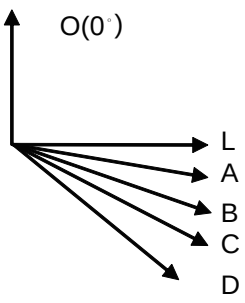
The buzzer will send a “Di” sound when the air conditioner is powered up or received the information sent by the remote control or there is a button input, the single tube cooler doesnt receive the remote control ON signal under the mode of heating mode.

(8) Auto button

If the controller is on, it will stop by pressing the button, and if the controller is off, it will be automatic running state by pressing the button, swing on and light on, and the main unit will run based on the remote control if there is remote control order.

(9) Up-and-Down Swinging Control

When power on, the up-and-down motor will firstly move the air deflector to o counter-clockwise, close the air outlet. After starting the machine, if you dont set the swinging function, heating mode and auto-heating mode, the up-and-down air deflector will move to D clockwise; under other modes, the up-and-down air deflector will move to L1. If you set the swinging function when you start the machine, then the wind blade will swing between L and D. The air deflector has 7 swinging states: Location L, Location A, Location B, Location C, Location D, Location L to Location D, stop at any location between L-D (the included angle between L~D is the same). The air deflector will be closed at 0 Location, and the swinging is effectual only on condition that setting the swinging order and the



inner fan is running. The indoor fan and compressor may get the power when air deflector is on the default location.

(10) Display(NOTE:Nixie tube is not available for A8 panel.)

① Operation pattern and mode pattern display

All the display patterns will display for a time when the power on, the operation indication pattern will display in red under standby status. When the machine is start by remote control, the indication pattern will light and display the current operation mode (the mode light includes: Cooling, heating and dehumidify). If you close the light key, all the display patterns will close.

② Double-8 display

According to the different setting of remote control, the nixie light may display the current temperature (the temperature scope is from 16 to 30°C) and indoor ambient temperature. The heating and air supply temperature will display 25°C under auto-mode, the temperature will display 20°C under the heating mode, and under defrosting status, heating indicator on indoor unit OFF 0.5s and ON 10s.(If you set the fahrenheit temperature display, the nixie light will display according to fahrenheit temperature)

(11) Protection function and failure display

E2: Freeze-proofing protection E4: Exhausting protection E5: Overcurrent protection E6: Communication failure

F1: Indoor ambient sensor start and short circuit (continuously measured failure in 5S)

F2: Indoor evaporator sensor start and short circuit (continuously measured failure in 5S)

F3: Outdoor ambient sensor start and short circuit (continuously measured failure in 30S)

F4: Outdoor condenser sensor start and short circuit (continuously measured failure in 30S, and dont measure within 10 minutes after defrosted)

F5: Outdoor exhausting sensor start and short circuit (continuously measured failure in 30S after the compressor operated 3 minutes)

H3: Overload protection of compressor H5: Module protection PH: High-voltage protection PL: Low-voltage protection

P1: Nominal cooling and heating P2: Maximum cooling and heating P3: Medium cooling and heating

P0: Minimum cooling and heating

(12) Drying Function

You may start or stop the drying function under the modes of cooling and dehumidify at the starting status (The modes of automatism, heating and air supply do not have drying function). When you start the drying function, after stop the machine by pressing the switch button, you should keep running the inner fans for 2 minutes under low air damper (The swing will operate as the least status within 2 minutes, and other load is stopped), then stop the entire machine;When you stop the drying function, press the switch button will stop the machine directly.

When you start the drying function, operating the drying button will stop the inner fans and close the guide louver.

(13) Power-failure memory function

What will be memorized includes modes, up and down wind blow, light, preset temperature, preset wind speed, general timing (no memory for moment timing), and Fahrenheit /Celsius degree. When the unit is powered on again after power failure, operation continues according to memorized content. If timing is not set by the last remote control command, the system will memorize the last remote control command and operate in the mode specified in the last remote control command. If timing is set by the last remote control command and power failure happens before the preset time, the system, as powered on again, will memorize the timing function set by the last remote control command. Timing will be re-counted from the time at which the system is powered again. If timing is set by the last remote control command and timing of start or stop is reached before power failure, the system, as powered on again, will memorize operation state before power failure and will not perform timing action. Moment timing is out the range of memory.

(14) Refrigerant recycling function (applicable when changing installation location or in maintenance)

1. Enter refrigerant recycling function

Within 5min after energizing (unit ON or OFF status is ok), continuously press LIGHT button for 3 times within 3s to enter refrigerant recycling mode; Fo is displayed and refrigerant recycling function is started. At this moment, the maintenance people closes liquid valve. After 5min, stick the thimble of maintenance valve with a tool. If there is no refrigerant spraying out, close the gas valve immediately and then turn off the unit to remove the connection pipe.

2. Exit refrigerant recycling function

After entering refrigerant recycling mode, when receive any remote control signal or enter refrigerant recycling mode for 25min, the unit will exit refrigerant recycling mode automatically If the unit is in standby mode before refrigerant recycling, it will be still in standby mode after finishing refrigerant recycling; if the unit is in ON status before refrigerant recycling, it will still run in original operation mode.

(15) Compulsive Defrosting Function

1. Start up compulsory defrosting function

Under ON status, set heating mode with remote controller and adjust the temperature to 16°C. Press “+, -, +, -, +,-” button successively within 5s and the complete unit will enter into compulsory defrosting status. Meanwhile, heating indicator on indoor unit will ON 10s and OFF 0.5s successively. (Note: If complete unit has malfunction or stops operation due to protection, compulsory defrosting function can be started up after malfunction or protection is resumed.

2. Exit compulsory defrosting mode

After compulsory defrosting is started up, the complete unit will exit defrosting operation according to the actual defrosting result, and the complete unit will resume normal heating operation.

Part Ⅱ : Installation and Maintenance

7. Notes for Installation and Maintenance

Safety Precautions: Important!

Please read the safety precautions carefully before installation and maintenance.
The following contents are very important for installation and maintenance.

Please follow the instructions below.

●The installation or maintenance must accord with the instructions.
●Comply with all national electrical codes and local electrical codes.
●Pay attention to the warnings and cautions in this manual.
●All installation and maintenance shall be performed by distributor or qualified person.
●All electric work must be performed by a licensed technician according to local regulations and the instructions given in this manual.
●Be caution during installation and maintenance. Prohibit incorrect operation to prevent electric shock, casualty and other accidents.

Warnings

Electrical Safety Precautions:

1. Cut off the power supply of air conditioner before checking and maintenance.
2. The air condition must apply specialized circuit and prohibit share the same circuit with other appliances.
3. The air conditioner should be installed in suitable location and ensure the power plug is touchable.
4. Make sure each wiring terminal is connected firmly during installation and maintenance.
5. Have the unit adequately grounded. The grounding wire can't be used for other purposes.
6. Must apply protective accessories such as protective boards, cable-cross loop and wire clip.
7. The live wire, neutral wire and grounding wire of power supply must be corresponding to the live wire, neutral wire and grounding wire of the air conditioner.
8. The power cord and power connection wires can't be pressed by hard objects.
9. If power cord or connection wire is broken, it must be replaced by a qualified person.
10. If the power cord or connection wire is not long enough, please get the specialized power cord or connection wire from the manufacture or distributor. Prohibit prolong the wire by yourself.
11. For the air conditioner without plug, an air switch must be installed in the circuit. The air switch should be all-pole parting and the contact parting distance should be more than 3mm.
12. Make sure all wires and pipes are connected properly and the valves are opened before energizing.
13. Check if there is electric leakage on the unit body. If yes, please eliminate the electric leakage.
14. Replace the fuse with a new one of the same specification if it is burnt down; don't replace it with a cooper wire or conducting wire.
15. If the unit is to be installed in a humid place, the circuit breaker must be installed.

Installation Safety Precautions:

1. Select the installation location according to the requirement of this manual.(See the requirements in installation part)
2. Handle unit transportation with care; the unit should not be carried by only one person if it is more than 20kg.
3. When installing the indoor unit and outdoor unit, a sufficient fixing bolt must be installed; make sure the installation support is firm.
4. Ware safety belt if the height of working is above 2m.
5. Use equipped components or appointed components during installation.
6. Make sure no foreign objects are left in the unit after finishing installation.

Refrigerant Safety Precautions:

1. Avoid contact between refrigerant and fire as it generates poisonous gas; Prohibit prolong the connection pipe by welding.
2. Apply specified refrigerant only. Never have it mixed with any other refrigerant. Never have air remain in the refrigerant line as it may lead to rupture or other hazards.
3. Make sure no refrigerant gas is leaking out when installation is completed.
4. If there is refrigerant leakage, please take sufficient measure to minimize the density of refrigerant.
5. Never touch the refrigerant piping or compressor without wearing glove to avoid scald or frostbite.

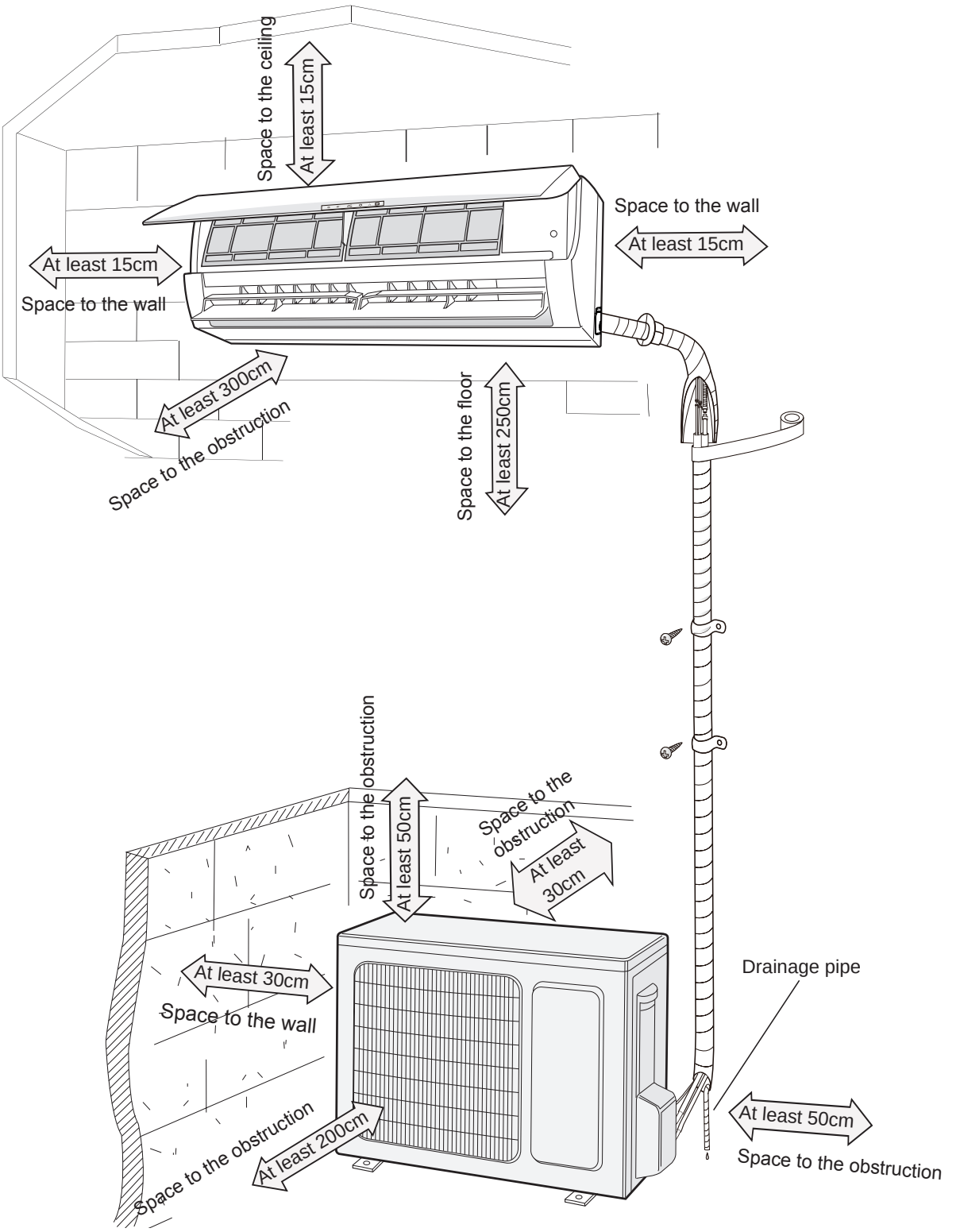
Improper installation may lead to fire hazard, explosion, electric shock or injury.

Main Tools for Installation and Maintenance

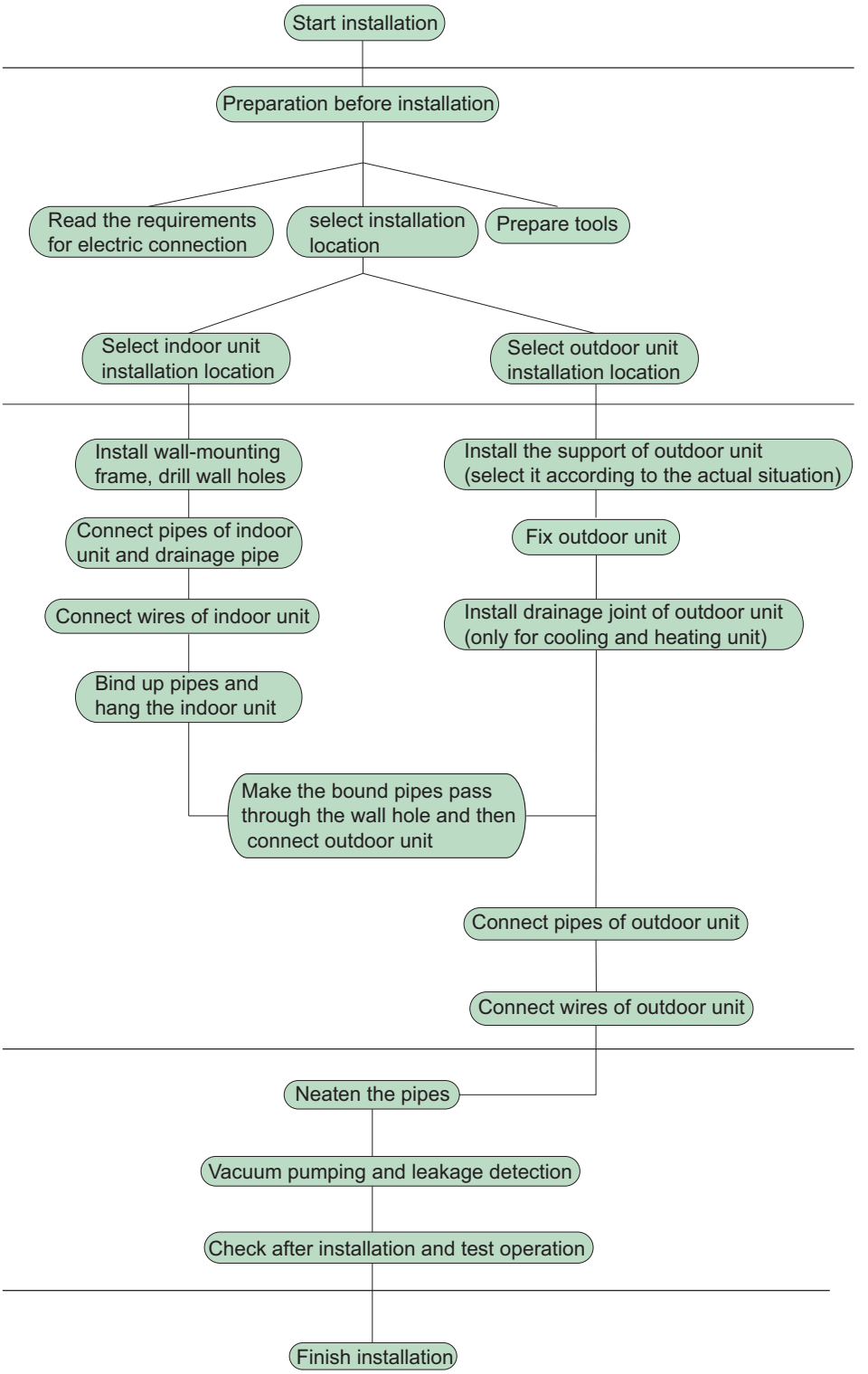
1. Level meter, measuring tape	**2. Screw driver**	**3. Impact drill, drill head, electric drill**
4. Electroprobe	**5. Universal meter**	**6. Torque wrench, open-end wrench, inner hexagon spanner**
7. Electronic leakage detector	**8. Vacuum pump**	**9. Pressure meter**
10. Pipe pliers, pipe cutter	**11. Pipe expander, pipe bender**	**12. Soldering appliance, refrigerant container**

8. Installation

8.1 Installation Dimension Diagram



Installation procedures


Start installation
Preparation before installation
Read the requirements for electric connection
select installation location
Prepare tools
Select indoor unit installation location
Select outdoor unit installation location
Install wall-mounting frame, drill wall holes
Install the support of outdoor unit (select it according to the actual situation)
Connect pipes of indoor unit and drainage pipe
Fix outdoor unit
Connect wires of indoor unit
Install drainage joint of outdoor unit (only for cooling and heating unit)
Bind up pipes and hang the indoor unit
Make the bound pipes pass through the wall hole and then connect outdoor unit
Connect pipes of outdoor unit
Connect wires of outdoor unit
Neaten the pipes
Vacuum pumping and leakage detection
Check after installation and test operation
Finish installation

Note: this flow is only for reference; please find the more detailed installation steps in this section.

8.2 Installation Parts-checking

No.	Name	No.	Name
1	Indoor unit	8	Sealing gum
2	Outdoor unit	9	Wrapping tape
3	Connection pipe	10	Support of outdoor unit
4	Drainage pipe	11	Fixing screw
5	Wall-mounting frame	12	Drainage plug(cooling and heating unit)
6	Connecting cable(power cord)	13	Owner's manual, remote controller
7	Wall pipe		

⚠ **Note:**
1.Please contact the local agent for installation.
2.Don't use unqualified power cord.

8.3 Selection of Installation Location

1. Basic Requirement:
Installing the unit in the following places may cause malfunction. If it is unavoidable, please consult the local dealer:
(1) The place with strong heat sources, vapors, flammable or explosive gas, or volatile objects spread in the air.
(2) The place with high-frequency devices (such as welding machine, medical equipment).
(3) The place near coast area.
(4) The place with oil or fumes in the air.
(5) The place with sulfureted gas.
(6) Other places with special circumstances.

2. Indoor Unit:
(1) There should be no obstruction near air inlet and air outlet.
(2) Select a location where the condensation water can be dispersed easily and won't affect other people.
(3) Select a location which is convenient to connect the outdoor unit and near the power socket.
(4) Select a location which is out of reach for children.
(5) The location should be able to withstand the weight of indoor unit and won't increase noise and vibration.
(6) The appliance must be installed 2.5m above floor.
(7) Don't install the indoor unit right above the electric appliance.
(8) The appliance shall not be installed in the laundry.

3. Outdoor Unit:
(1) Select a location where the noise and outflow air emitted by the outdoor unit will not affect neighborhood.
(2) The location should be well ventilated and dry, in which the outdoor unit won't be exposed directly to sunlight or strong wind.
(3) The location should be able to withstand the weight of outdoor unit.
(4) Make sure that the installation follows the requirement of installation dimension diagram.
(5) Select a location which is out of reach for children and far away from animals or plants.If it is unavoidable, please add fence for safety purpose.

8.4 Electric Connection Requirement

1. Safety Precaution
(1) Must follow the electric safety regulations when installing the unit.
(2) According to the local safety regulations, use qualified power supply circuit and air switch.
(3) Make sure the power supply matches with the requirement of air conditioner. Unstable power supply or incorrect wiring may result in electric shock,fire hazard or malfunction. Please install proper power supply cables before using the air conditioner.

Air-conditioner	Air switch capacity
ASH-09AIE2 ASH-12AIE2	16A

(4) Properly connect the live wire, neutral wire and grounding wire of power socket.
(5) Be sure to cut off the power supply before proceeding any work related to electricity and safety.
(6) Do not put through the power before finishing installation.
(7) For appliances with type Y attachment,the instructions shall contain the substance of thefollowing.If the supply cord is damaged,it must be replaced by the manufacturer,its service agent or similarly qualified persons in order to avoid a hazard.
(8) The temperature of refrigerant circuit will be high, please keep the interconnection cable away from the copper tube.

2. Grounding Requirement:
(1) The air conditioner is first class electric appliance. It must be properly grounding with specialized grounding device by a professional. Please make sure it is always grounded effectively, otherwise it may cause electric shock.
(2) The yellow-green wire in air conditioner is grounding wire, which can't be used for other purposes.
(3) The grounding resistance should comply with national electric safety regulations.
(4) The appliance must be positioned so that the plug is accessible.
(5) An all-pole disconnection switch having a contact separation of at least 3mm in all poles should be connected in fixed wiring.
(6) Including an air switch with suitable capacity, please note the following table. Air switch should be included magnet buckle and heating buckle function, it can protect the circuit-short and overload. (Caution: please do not use the fuse only for protect the circuit)

8.5 Installation of Indoor Unit

1. Choosing Installation location
Recommend the installation location to the client and then confirm it with the client.

2. Install Wall-mounting Frame
(1) Hang the wall-mounting frame on the wall; adjust it in horizontal position with the level meter and then point out the screw fixing holes on the wall.
(2) Drill the screw fixing holes on the wall with impact drill (the specification of drill head should be the same as the plastic expansion particle) and then fill the plastic expansion particles

in the holes.
(3) Fix the wall-mounting frame on the wall with tapping screws (ST4.2X25TA) and then check if the frame is firmly installed by pulling the frame. If the plastic expansion particle is loose, please drill another fixing hole nearby.

3. Install Wall-mounting Frame

(1) Choose the position of piping hole according to the direction of outlet pipe. The position of piping hole should be a little lower than the wall-mounted frame.(As show in Fig.1)

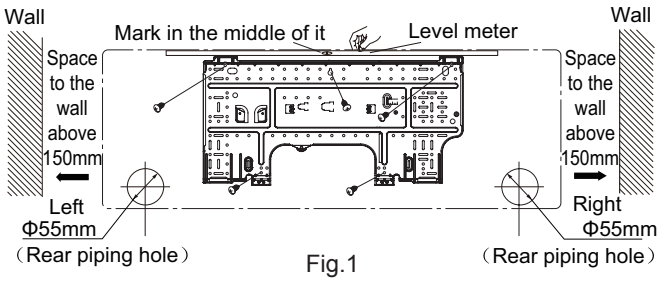


Fig.1

(2) Open a piping hole with the diameter of Φ55mm on the selected outlet pipe position.In order to drain smoothly, slant the piping hole on the wall slightly downward to the outdoor side with the gradient of 5-10°.(As show in Fig.2)

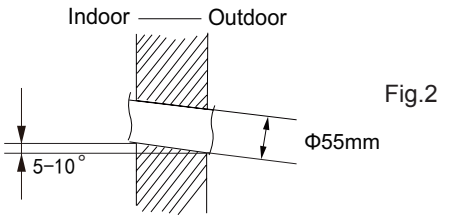


Fig.2

⚠ **Note:**

(1) Pay attention to dust prevention and take relevant safety measures when opening the hole.
(2) The plastic expansion particles are not provided and should be bought locally.

4. Outlet Pipe

(1) The pipe can be led out in the direction of right, rear right, left or rear left.(As show in Fig.3)
(2) When selecting leading out the pipe from left or right, please cut off the corresponding hole on the bottom case.(As show in Fig.4)

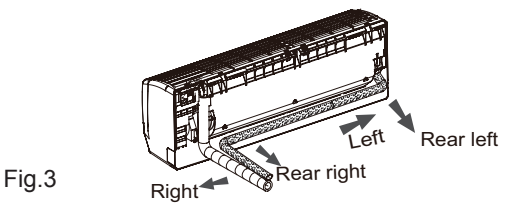


Fig.3

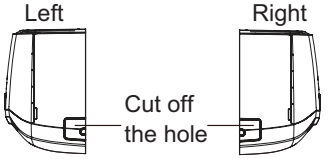


Fig.4

5. Connect the Pipe of Indoor Unit

(1) Aim the pipe joint at the corresponding bellmouth.(As show in Fig.5)
(2) Pretightening the union nut with hand.
(3) Adjust the torque force by referring to the following sheet. Place the open-end wrench on the pipe joint and place the torque wrench on the union nut. Tighten the union nut with torque wrench.(As show in Fig.6)
(4) Wrap the indoor pipe and joint of connection pipe with insulating pipe, and then wrap it with tape.(As show in Fig.7)

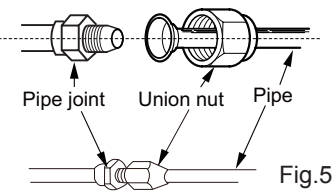


Fig.5

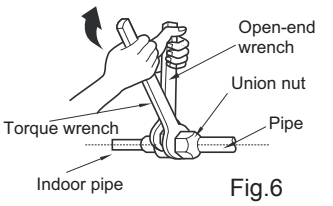


Fig.6

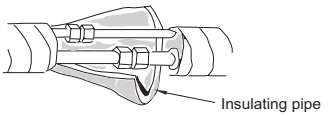


Fig.7

Refer to the following table for wrench moment of force：

Hex nut diameter(mm)	Tightening torque(N·m)
Φ6	15~20
Φ9.52	30~40
Φ12	45~55
Φ16	60~65
Φ19	70~75

6. Install Drain Hose

(1) Connect the drain hose to the outlet pipe of indoor unit.(As show in Fig.8)
(2) Bind the joint with tape.(As show in Fig.9)

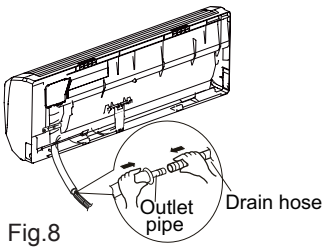


Fig.8

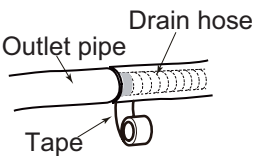


Fig.9

⚠ **Note:**

(1) Add insulating pipe in the indoor drain hose in order to prevent condensation.
(2) The plastic expansion particles are not provided.
(As show in Fig.10)

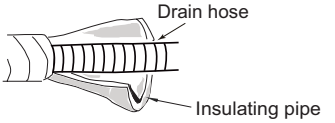


Fig.10

7. Connect Wire of Indoor Unit

(1) Open the panel, remove the screw on the wiring cover and then take down the cover.(As show in Fig.11)

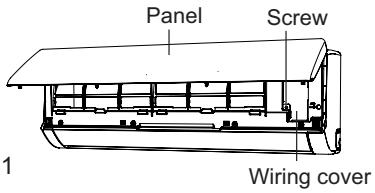


Fig.11

(2) Make the power connection wire go through the cable-cross hole at the back of indoor unit and then pull it out from the front side.(As show in Fig.12)

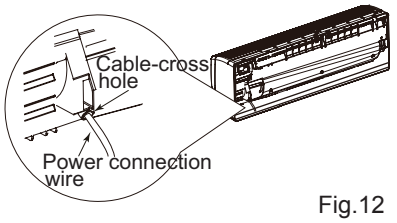


Fig.12

(3) Remove the wire clip; connect the power connection wire to the wiring terminal according to the color; tighten the screw and then fix the power connection wire with wire clip.(As show in Fig.13)

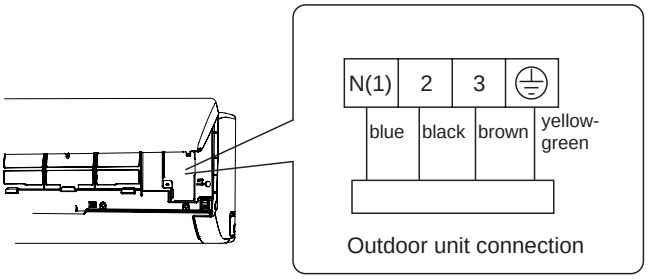


Fig.13

(4) Put wiring cover back and then tighten the screw.
(5) Close the panel.

⚠ **Note:**

(1) All wires of indoor unit and outdoor unit should be connected by a professional.
(2) If the length of power connection wire is insufficient, please contact the supplier for a new one. Avoid extending the wire by yourself.
(3) For the air conditioner with plug, the plug should be reachable after finishing installation.
(4) For the air conditioner without plug, an air switch must be installed in the line. The air switch should be all-pole parting and the contact parting distance should be more than 3mm.

8. Bind up Pipe

(1) Bind up the connection pipe, power cord and drain hose with the band.(As show in Fig.14)
(2) Reserve a certain length of drain hose and power cord for installation when binding them. When binding to a certain degree, separate the indoor power and then separate the drain hose.(As show in Fig.15)
(3) Bind them evenly.
(4) The liquid pipe and gas pipe should be bound separately at the end.

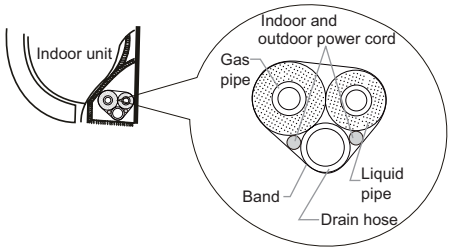


Fig.14

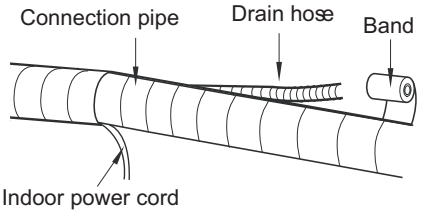


Fig.15

⚠ **Note:**

(1) The power cord and control wire can't be crossed or winding.
(2) The drain hose should be bound at the bottom.

9. Hang the Indoor Unit

(1) Put the bound pipes in the wall pipe and then make them pass through the wall hole.
(2) Hang the indoor unit on the wall-mounting frame.
(3) Stuff the gap between pipes and wall hole with sealing gum.
(4) Fix the wall pipe.(As show in Fig.16)
(5) Check if the indoor unit is installed firmly and closed to the wall.(As show in Fig.17)

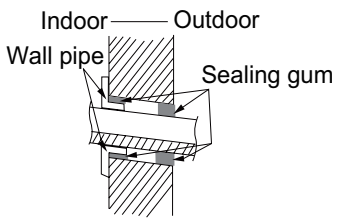
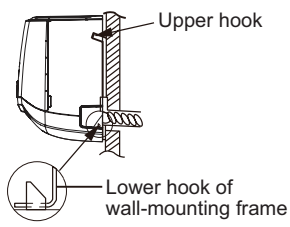


Fig.16

Fig.17



⚠ **Note:**

Do not bend the drain hose too excessively in order to prevent blocking.

8.6 Installation of Outdoor Unit

1. Fix the Support of Outdoor Unit(Select it according to the actual installation situation)

(1) Select installation location according to the house structure.
(2) Fix the support of outdoor unit on the selected location with expansion screws.

⚠ **Note:**

(1) Take sufficient protective measures when installing the outdoor unit.
(2) Make sure the support can withstand at least four times the unit weight.
(3) The outdoor unit should be installed at least 3cm above the floor in order to install drain joint.(As show in Fig.18)
(4) For the unit with cooling capacity of 2300W~5000W, 6 expansion screws are needed; for the unit with cooling capacity of 6000W~8000W, 8 expansion screws are needed; for the unit with cooling capacity of 10000W~16000W, 10 expansion screws are needed.

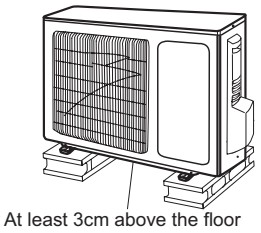


Fig.18

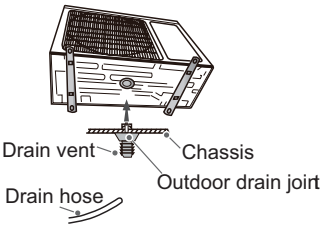


Fig.19

2. Install Drain Joint(Only for cooling and heating unit)

(1) Connect the outdoor drain joint into the hole on the chassis.
(2) Connect the drain hose into the drain vent.(As show in Fig.19)

3. Fix Outdoor Unit

(1) Place the outdoor unit on the support.
(2) Fix the foot holes of outdoor unit with bolts.(As show in Fig.20)

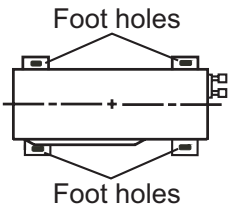


Fig.20

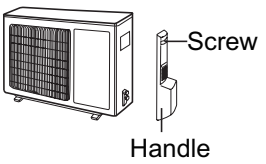


Fig.21

4. Connect Indoor and Outdoor Pipes

(1) Remove the screw on the right handle of outdoor unit and then remove the handle.(As show in Fig.21)
(2) Remove the screw cap of valve and aim the pipe joint at the bellmouth of pipe.(As show in Fig.22)

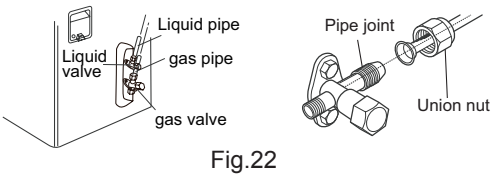


Fig.22

(3) Pretightening the union nut with hand.
(4) Tighten the union nut with torque wrench .

Refer to the following table for wrench moment of force:

Hex nut diameter(mm)	Tightening torque(N·m)
Φ6	15~20
Φ9.52	30~40
Φ12	45~55
Φ16	60~65
Φ19	70~75

5. Connect Outdoor Electric Wire

(1) Remove the wire clip; connect the power connection wire and power cord to the wiring terminal according to the color; fix them with screws.(As show in Fig.23)

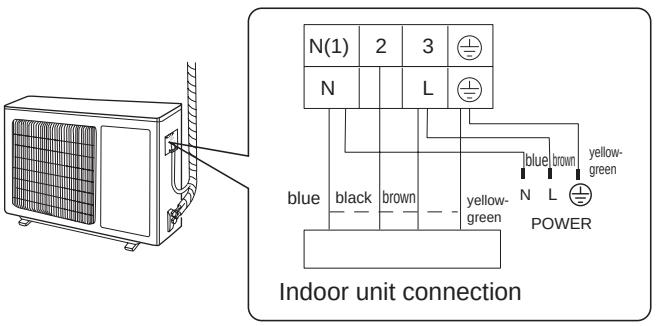


Fig.23

(2) Fix the power connection wire and power cord with wire clip.

⚠ **Note:**

(1) After tightening the screw, pull the power cord slightly to check if it is firm.
(2) Never cut the power connection wire to prolong or shorten the distance.

6. Neaten the Pipes

(1) The pipes should be placed along the wall, bent reasonably and hidden possibly. Min. semidiameter of bending the pipe is 10cm.
(2) If the outdoor unit is higher than the wall hole, you must set a U-shaped curve in the pipe before pipe goes into the room, in order to prevent rain from getting into the room.(As show in Fig.24)

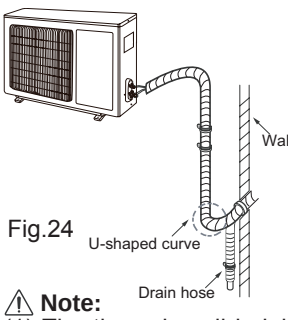


Fig.24

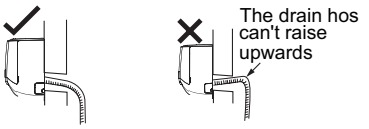


Fig.25

⚠ **Note:**

(1) The through-wall height of drain hose shouldn't be higher than the outlet pipe hole of indoor unit.(As show in Fig.25)
(2) Slant the drain hose slightly downwards. The drain hose can't be curved, raised and fluctuant, etc.(As show in Fig.26)
(3) The water outlet can't be placed in water in order to drain smoothly.(As show in Fig.27)

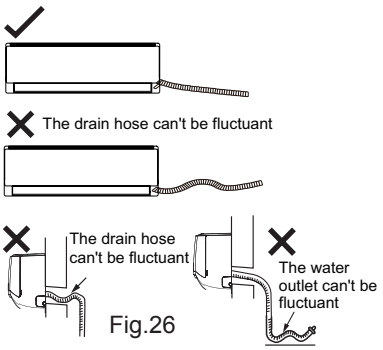


Fig.26

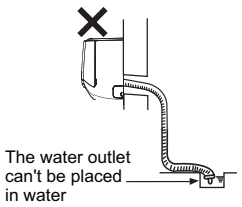


Fig.27

8.7 Vacuum Pumping and Leak Detection

1. Use Vacuum Pump

(1) Remove the valve caps on the liquid valve and gas valve and the nut of refrigerant charging vent.

(2) Connect the charging hose of piezometer to the refrigerant charging vent of gas valve and then connect the other charging hose to the vacuum pump.

(3) Open the piezometer completely and operate for 10-15min to check if the pressure of piezometer remains in -0.1MPa.

(4) Close the vacuum pump and maintain this status for 1-2min to check if the pressure of piezometer remains in -0.1MPa. If the pressure decreases, there may be leakage.

(5) Remove the piezometer, open the valve core of liquid valve and gas valve completely with inner hexagon spanner.

(6) Tighten the screw caps of valves and refrigerant charging vent.(As show in Fig.28)

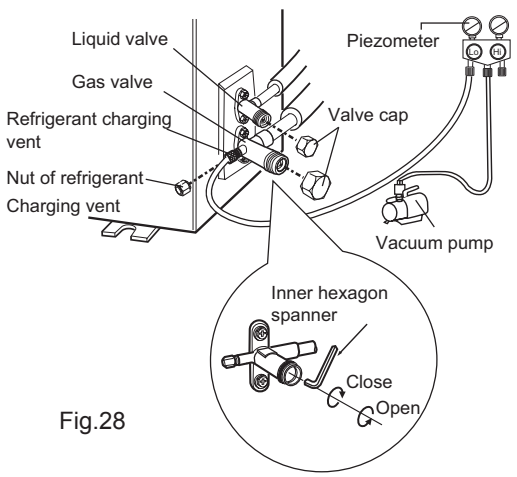


Fig.28

2. Leakage Detection

(1) With leakage detector:

Check if there is leakage with leakage detector.

(2) With soap water:

If leakage detector is not available, please use soap water for leakage detection. Apply soap water at the suspected position and keep the soap water for more than 3min. If there are air bubbles coming out of this position, there's a leakage.

8.8 Check after Installation and Test Operation

1. Check after Installation

Check according to the following requirement after finishing installation.

No.	Items to be checked	Possible malfunction
1	Has the unit been installed firmly?	The unit may drop, shake or emit noise.
2	Have you done the refrigerant leakage test?	It may cause insufficient cooling (heating) capacity.
3	Is heat insulation of pipeline sufficient?	It may cause condensation and water dripping.
4	Is water drained well?	It may cause condensation and water dripping.
5	Is the voltage of power supply according to the voltage marked on the nameplate?	It may cause malfunction or damage the parts.
6	Is electric wiring and pipeline installed correctly?	It may cause malfunction or damage the parts.
7	Is the unit grounded securely?	It may cause electric leakage.
8	Does the power cord follow the specification?	It may cause malfunction or damage the parts.
9	Is there any obstruction in air inlet and air outlet?	It may cause insufficient cooling (heating).
10	The dust and sundries caused during installation are removed?	It may cause malfunction or damaging the parts.
11	The gas valve and liquid valve of connection pipe are open completely?	It may cause insufficient cooling (heating) capacity.

2. Test Operation

(1) Preparation of test operation

● The client approves the air conditioner installation.

● Specify the important notes for air conditioner to the client.

(2) Method of test operation

● Put through the power, press ON/OFF button on the remote controller to start operation.

● Press MODE button to select AUTO, COOL, DRY, FAN and HEAT to check whether the operation is normal or not.

● If the ambient temperature is lower than 16℃ , the air conditioner can't start cooling.

9. Maintenance

9.1 Flashing LED of Indoor/Outdoor Unit and Primary Judgement

No.	Malfunction Name	Display Method of Indoor Unit				Display Method of Outdoor Unit			A/C status	Possible Causes
		Dual-8 Code Display	Indicator Display (during blinking, ON 0.5s and OFF 0.5s)			Indicator has 3 kinds of display status and during blinking, ON 0.5s and OFF 0.5s				
			Operation Indicator	Cool Indicator	Heating Indicator	Yellow Indicator	Red Indicator	Green Indicator		
1	High pressure protection of system	E1							During cooling and drying operation, except indoor fan operates, all loads stop operation. During heating operation, the complete unit stops.	Possible reasons: 1. Refrigerant was superabundant; 2. Poor heat exchange (including filth blockage of heat exchanger and bad radiating environment); Ambient temperature is too high.
2	Antifreezing protection	E2				OFF 3S and blink 3 times			During cooling and drying operation, compressor and outdoor fan stop while indoor fan operates.	1. Poor air-return in indoor unit; 2. Fan speed is abnormal; 3. Evaporator is dirty.
3	System block or refrigerant leakage	E3					OFF 3S and blink 9 times		The Dual-8 Code Display will show E3 until the low pressure switch stop operation.	1.Low-pressure protection 2.Low-pressure protection of system 3.Low-pressure protection of compressor
4	High discharge temperature protection of compressor	E4				OFF 3S and blink 7 times			During cooling and drying operation, compressor and outdoor fan stop while indoor fan operates. During heating operation, all loads stop.	Please refer to the malfunction analysis (discharge protection, overload).
5	Overcurrent protection	E5				OFF 3S and blink 5 times			During cooling and drying operation, compressor and outdoor fan stop while indoor fan operates. During heating operation, all loads stop.	1. Supply voltage is unstable; 2. Supply voltage is too low and load is too high; 3. Evaporator is dirty.
6	Communi-cation Malfunction	E6						OFF	During cooling operation, compressor stops while indoor fan motor operates. During heating operation, the complete unit stops.	Refer to the corresponding malfunction analysis.
7	High temperature resistant protection	E8				OFF 3S and blink 6 times			During cooling operation: compressor will stop while indoor fan will operate. During heating operation, the complete unit stops.	Refer to the malfunction analysis (overload, high temperature resistant).
8	EEPROM malfunction	EE				OFF 3S and blink 11 times			During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop	Replace outdoor control panel AP1
9	Limit/ decrease frequency due to high temperature of module	EU							All loads operate normally, while operation frequency for compressor is decreased	Discharging after the complete unit is de-energized for 20mins, check whether the thermal grease on IPM Module of outdoor control panel AP1 is sufficient and whether the radiator is inserted tightly. If its no use, please replace control panel AP1.
10	Malfunction protection of jumper cap	C5							Wireless remote receiver and button are effective, but can not dispose the related command	1. No jumper cap insert on mainboard. 2. Incorrect insert of jumper cap. 3. Jumper cap damaged. 4. Abnormal detecting circuit of mainboard.

No.	Malfunction Name	Display Method of Indoor Unit				Display Method of Outdoor Unit			A/C status	Possible Causes
		Dual-8 Code Display	Indicator Display (during blinking, ON 0.5s and OFF 0.5s)			Indicator has 3 kinds of display status and during blinking, ON 0.5s and OFF 0.5s				
			Operation Indicator	Cool Indicator	Heating Indicator	Yellow Indicator	Red Indicator	Green Indicator		
11	Gathering refrigerant	Fo							When the outdoor unit receive signal of Gathering refrigerant ,the system will be forced to run under cooling mode for gathering refrigerant	Nominal cooling mode
12	Indoor ambient temperature sensor is open/short circuited	F1							During cooling and drying operation, indoor unit operates while other loads will stop; during heating operation, the complete unit will stop operation.	1. Loosening or bad contact of indoor ambient temp. sensor and mainboard terminal. 2. Components in mainboard fell down leads short circuit. 3. Indoor ambient temp. sensor damaged.(check with sensor resistance value chart) 4. Mainboard damaged.
13	Indoor evaporator temperature sensor is open/short circuited	F2							AC stops operation once reaches the setting temperature. Cooling, drying: internal fan motor stops operation while other loads stop operation; heating: AC stop operation	1. Loosening or bad contact of Indoor evaporator temp. sensor and mainboard terminal. 2. Components on the mainboard fall down leads short circuit. 3. Indoor evaporator temp. sensor damaged.(check temp. sensor value chart for testing) 4. Mainboard damaged.
14	Outdoor ambient temperature sensor is open/short circuited	F3					OFF 3S and blink 6 times		During cooling and drying operating, compressor stops while indoor fan operates; During heating operation, the complete unit will stop operation	Outdoor temperature sensor hasnt been connected well or is damaged. Please check it by referring to the resistance table for temperature sensor)
15	Outdoor condenser temperature sensor is open/short circuited	F4					OFF 3S and blink 5 times		During cooling and drying operation, compressor stops while indoor fan will operate; During heating operation, the complete unit will stop operation.	Outdoor temperature sensor hasnt been connected well or is damaged. Please check it by referring to the resistance table for temperature sensor)
16	Outdoor discharge temperature sensor is open/short circuited	F5					OFF 3S and blink 7 times		During cooling and drying operation, compressor will sop after operating for about 3 mins, while indoor fan will operate; During heating operation, the complete unit will stop after operating for about 3 mins.	1.Outdoor temperature sensor hasnt been connected well or is damaged. Please check it by referring to the resistance table for temperature sensor) 2.The head of temperature sensor hasnt been inserted into the copper tube
17	Limit/ decrease frequency due to overload	F6					OFF 3S and blink 3 times		All loads operate normally, while operation frequency for compressor is decreased	Refer to the malfunction analysis (overload, high temperature resistant)
18	Decrease frequency due to overcurrent	F8					OFF 3S and blink once		All loads operate normally, while operation frequency for compressor is decreased	The input supply voltage is too low; System pressure is too high and overload

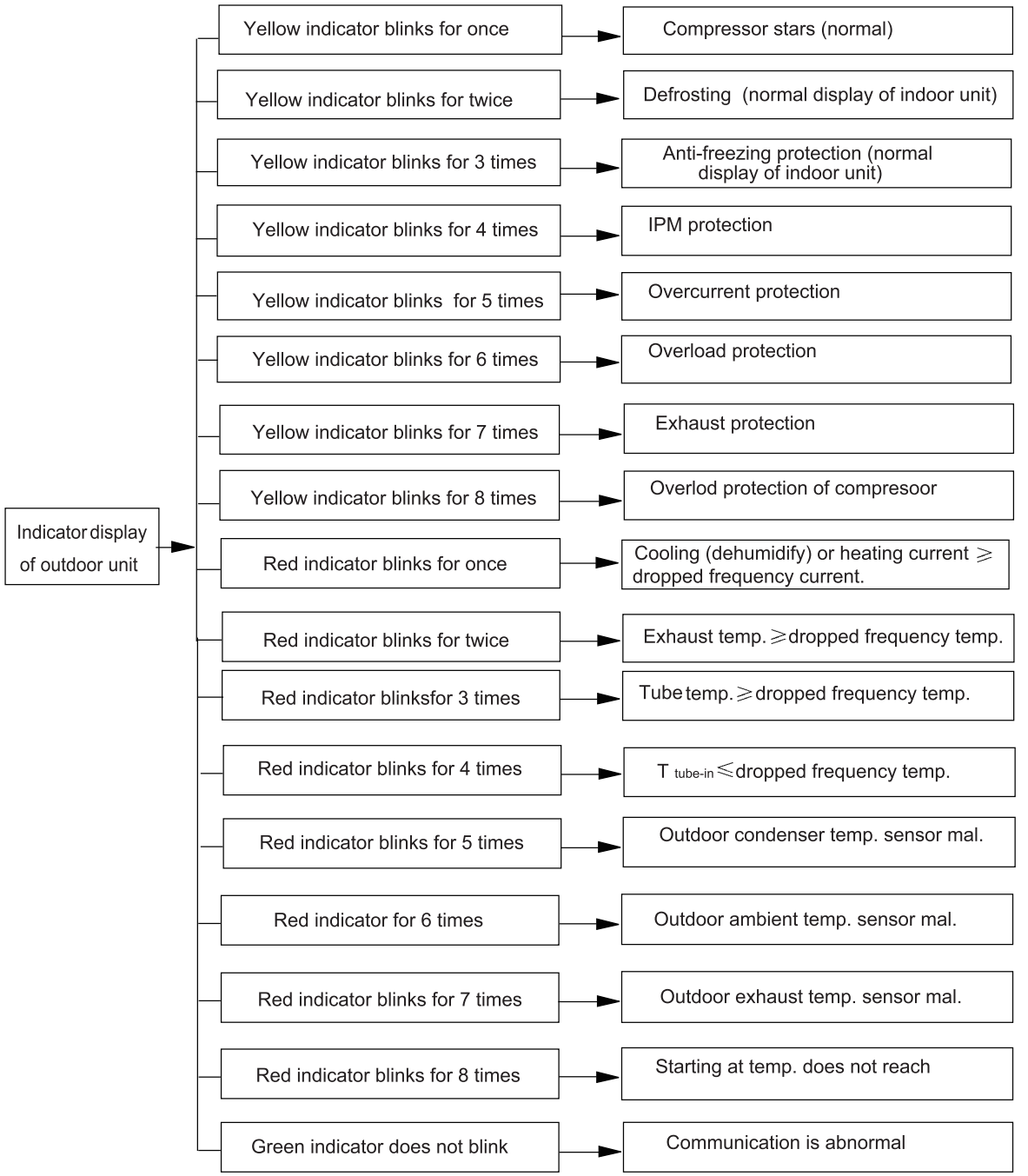
No.	Malfunction Name	Display Method of Indoor Unit				Display Method of Outdoor Unit			A/C status	Possible Causes
		Dual-8 Code Display	Indicator Display (during blinking, ON 0.5s and OFF 0.5s)			Indicator has 3 kinds of display status and during blinking, ON 0.5s and OFF 0.5s				
			Operation Indicator	Cool Indicator	Heating Indicator	Yellow Indicator	Red Indicator	Green Indicator		
19	Decrease frequency due to high air discharge	F9					OFF 3S and blink twice		All loads operate normally, while operation frequency for compressor is decreased	Overload or temperature is too high; Refrigerant is insufficient; Malfunction of electric expansion valve (EKV)
20	Limit/ decrease frequency due to antifreezing	FH					OFF 3S and blink 4 times		All loads operate normally, while operation frequency for compressor is decreased	Poor air-return in indoor unit or fan speed is too low
21	Voltage for DC bus-bar is too high	PH				OFF 3S and blink 13 times			During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation.	1. Measure the voltage of position L and N on wiring board (XT), if the voltage is higher than 265VAC, turn on the unit after the supply voltage is increased to the normal range. 2.If the AC input is normal, measure the voltage of electrolytic capacitor C on control panel (AP1), if its normal, theres malfunction for the circuit, please replace the control panel (AP1)
22	Voltage of DC bus-bar is too low	PL				OFF 3S and blink 12 times			During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop	1. Measure the voltage of position L and N on wiring board (XT), if the voltage is higher than 150VAC, turn on the unit after the supply voltage is increased to the normal range. 2.If the AC input is normal, measure the voltage of electrolytic capacitor C on control panel (AP1), if its normal, theres malfunction for the circuit, please replace the control panel (AP1)
23	Compressor Min frequence in test state	P0								Showing during min. cooling or min. heating test
24	Compressor rated frequence in test state	P1								Showing during nominal cooling or nominal heating test
25	Compressor maximum frequence in test state	P2								Showing during max. cooling or max. heating test

No.	Malfunction Name	Display Method of Indoor Unit				Display Method of Outdoor Unit			A/C status	Possible Causes
		Dual-8 Code Display	Indicator Display (during blinking, ON 0.5s and OFF 0.5s)			Indicator has 3 kinds of display status and during blinking, ON 0.5s and OFF 0.5s				
			Operation Indicator	Cool Indicator	Heating Indicator	Yellow Indicator	Red Indicator	Green Indicator		
26	Compressor intermediate frequence in test state	P3								Showing during middle cooling or middle heating test
27	Overcurrent protection of phase current for compressor	P5							During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation.	Refer to the malfunction analysis (IPM protection, loss of synchronism protection and overcurrent protection of phase current for compressor.
28	Charging malfunction of capacitor	PU							During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop	Refer to the part three—charging malfunction analysis of capacitor
29	Malfunction of module temperature sensor circuit	P7							During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop	Replace outdoor control panel AP1
30	Module high temperature protection	P8							During cooling operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop	After the complete unit is de-energized for 20mins, check whether the thermal grease on IPM Module of outdoor control panel AP1 is sufficient and whether the radiator is inserted tightly. If its no use, please replace control panel AP1.
31	Overload protection for compressor	H3				OFF 3S and blink 8 times			During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation.	1. Wiring terminal OVC-COMP is loosened. In normal state, the resistance for this terminal should be less than 1ohm. 2.Refer to the malfunction analysis (discharge protection, overload)
32	IPM protection	H5				OFF 3S and blink 4 times			During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation.	Refer to the malfunction analysis (IPM protection, loss of synchronism protection and overcurrent protection of phase current for compressor.
33	Module temperature is too high	H5				OFF 3S and blink 10 times				

No.	Malfunction Name	Display Method of Indoor Unit				Display Method of Outdoor Unit			A/C status	Possible Causes
		Dual-8 Code Display	Indicator Display (during blinking, ON 0.5s and OFF 0.5s)			Indicator has 3 kinds of display status and during blinking, ON 0.5s and OFF 0.5s				
			Operation Indicator	Cool Indicator	Heating Indicator	Yellow Indicator	Red Indicator	Green Indicator		
34	Internal motor (fan motor) do not operate	H6							Internal fan motor, external fan motor, compressor and electric heater stop operation,guide louver stops at present location.	1. Bad contact of DC motor feedback terminal. 2. Bad contact of DC motor control end. 3. Fan motor is stalling. 4. Motor malfunction. 5. Malfunction of mainboard rev detecting circuit.
35	Desynchro-nizing of compressor	H7							During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation.	Refer to the malfunction analysis (IPM protection, loss of synchronism protection and overcurrent protection of phase current for compressor.
36	PFC protection	HC				OFF 3S and blink 14 times			During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation.	Refer to the malfunction analysis
37	Outdoor DC fan motor malfunction	L3					OFF 3S and blink 14 times		Outdoor DC fan motor malfunction lead to compressor stop operation,	DC fan motor malfunction or system blocked or the connector loosed
38	power protection	L9				OFF 3S and blink 9 times			compressor stop operation and Outdoor fan motor will stop 30s latter , 3 minutes latter fan motor and compressor will restart	To protect the electronical components when detect high power
39	Indoor unit and outdoor unit doesnt match	LP				OFF 3S and blink 16 times			compressor and Outdoor fan motor cant work	Indoor unit and outdoor unit doesnt match
40	Failure start-up	LC							During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation.	Refer to the malfunction analysis
41	Normal communica-tion							contino-usly		
42	Defrosting				OFF 3S and blink once (during blinking, ON 10s and OFF 0.5s)	OFF 3S and blink twice			Defrosting will occur in heating mode. Compressor will operate while indoor fan will stop operation.	Its the normal state

NO.	Malfunction Name	Display Method of Indoor Unit				Display Method of Outdoor Unit			A/C status	Possible Causes
		Dual-8 Code Display	Indicator Display (during blinking, ON 0.5s and OFF 0.5s)			Indicator has 3 kinds of display status and during blinking, ON 0.5s and OFF 0.5s				
			Operation Indicator	Cool Indicator	Heating Indicator	Yellow Indicator	Red Indicator	Green Indicator		
43	Malfunction of phase current detection circuit for compressor	U1							During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop	Replace outdoor control panel AP1
44	Malfunction of voltage dropping for DC bus-bar	U3							During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop	Supply voltage is unstable
45	Malfunction of complete units current detection	U5							During cooling and drying operation, the compressor will stop while indoor fan will operate; During heating operating, the complete unit will stop operation.	Theres circuit malfunction on outdoor units control panel AP1, please replace the outdoor units control panel AP1.
46	The four-way valve is abnormal	U7							If this malfunction occurs during heating operation, the complete unit will stop operation.	1.Supply voltage is lower than AC175V; 2.Wiring terminal 4V is loosened or broken; 3.4V is damaged, please replace 4V.
47	Frequency limiting (power)						OFF 3S and blink 13 times			
48	Compressor is open-circuited					OFF 3S and blink once				
49	The temperature for turning on the unit is reached						OFF 3S and blink 8 times			
50	Frequency limiting (module temperature)						OFF 3S and blink 11 times			
51	Malfunction of zero-cross detection circuit	U8							The complete unit stops	1.Power supply is abnormal; 2.Detection circuit of indoor control mainboard is abnormal.

If malfunction occurs,corresponding code will display and the unit will resume normal until protection or malfunction disappears.


Indicator display of outdoor unit
Yellow indicator blinks for once
Compressor stars (normal)
Yellow indicator blinks for twice
Defrosting (normal display of indoor unit)
Yellow indicator blinks for 3 times
Anti-freezing protection (normal display of indoor unit)
Yellow indicator blinks for 4 times
IPM protection
Yellow indicator blinks for 5 times
Overcurrent protection
Yellow indicator blinks for 6 times
Overload protection
Yellow indicator blinks for 7 times
Exhaust protection
Yellow indicator blinks for 8 times
Overlod protection of compresoor
Red indicator blinks for once
Cooling (dehumidify) or heating current ⩾ dropped frequency current.
Red indicator blinks for twice
Exhaust temp. ⩾dropped frequency temp.
Red indicator blinksfor 3 times
Tube temp. ⩾dropped frequency temp.
Red indicator blinks for 4 times
T tube-in ⩽dropped frequency temp.
Red indicator blinks for 5 times
Outdoor condenser temp. sensor mal.
Red indicator for 6 times
Outdoor ambient temp. sensor mal.
Red indicator blinks for 7 times
Outdoor exhaust temp. sensor mal.
Red indicator blinks for 8 times
Starting at temp. does not reach
Green indicator does not blink
Communication is abnormal

Analysis or processing of some of the malfunction display:

1. Compressor discharge protection

Possible causes: shortage of refrigerant; blockage of air filter; poor ventilation or air flow short pass for condenser; the system has noncondensing gas (such as air, water etc.); blockage of capillary assy (including filter); leakage inside four-way valve causes incorrect operation; malfunction of compressor; malfunction of protection relay; malfunction of discharge sensor; outdoor temperature too high.

Processing method: refer to the malfunction analysis in the above section.

2. Low voltage overcurrent protection

Possible cause: Sudden drop of supply voltage.

3. Communication malfunction

Processing method: Check if communication signal cable is connected reliably.

4. Sensor open or short circuit

Processing method: Check whether sensor is normal, connected with the corre sponding position on the controller and if damage of lead wire is found.

5. Compressor over load protection

Possible causes: insufficient or too much refrigrant; blockage of capillary and increase of suction temp.; improper running of compressor, burning in or stuck of bearing, damage of discharge valve; malfunction of protector.

Processing method: adjust refrigerant amount; replace the capillary; replace the compressor; use universal meter to check if the contactor of compress or is fine when it is not over heated, if not replace the protector.

6. System malfunction

i.e.overload protection.When tube temperature(Check the temperature of outdoor heat exchanger when cooling and check the temperatur e of indoor heat exchanger when heating) is too high, protection will be activated.

Possi ble causes: Outdoor temperature is too high when cooling; insufficient outdoor air circulation; refrigerant flow malfunction.

please refer to the malfunction analysis in the previous section for handling method .

7. IPM module protection

Processing method:Once the module malfunction happens,if it persists for a long time and can not be selfcanceled, cut off the power and turn off the unit,and then re-energize the unit again after about 10 min.After repeating the procedure for sever times, if the malfunction still exists,replace the module.

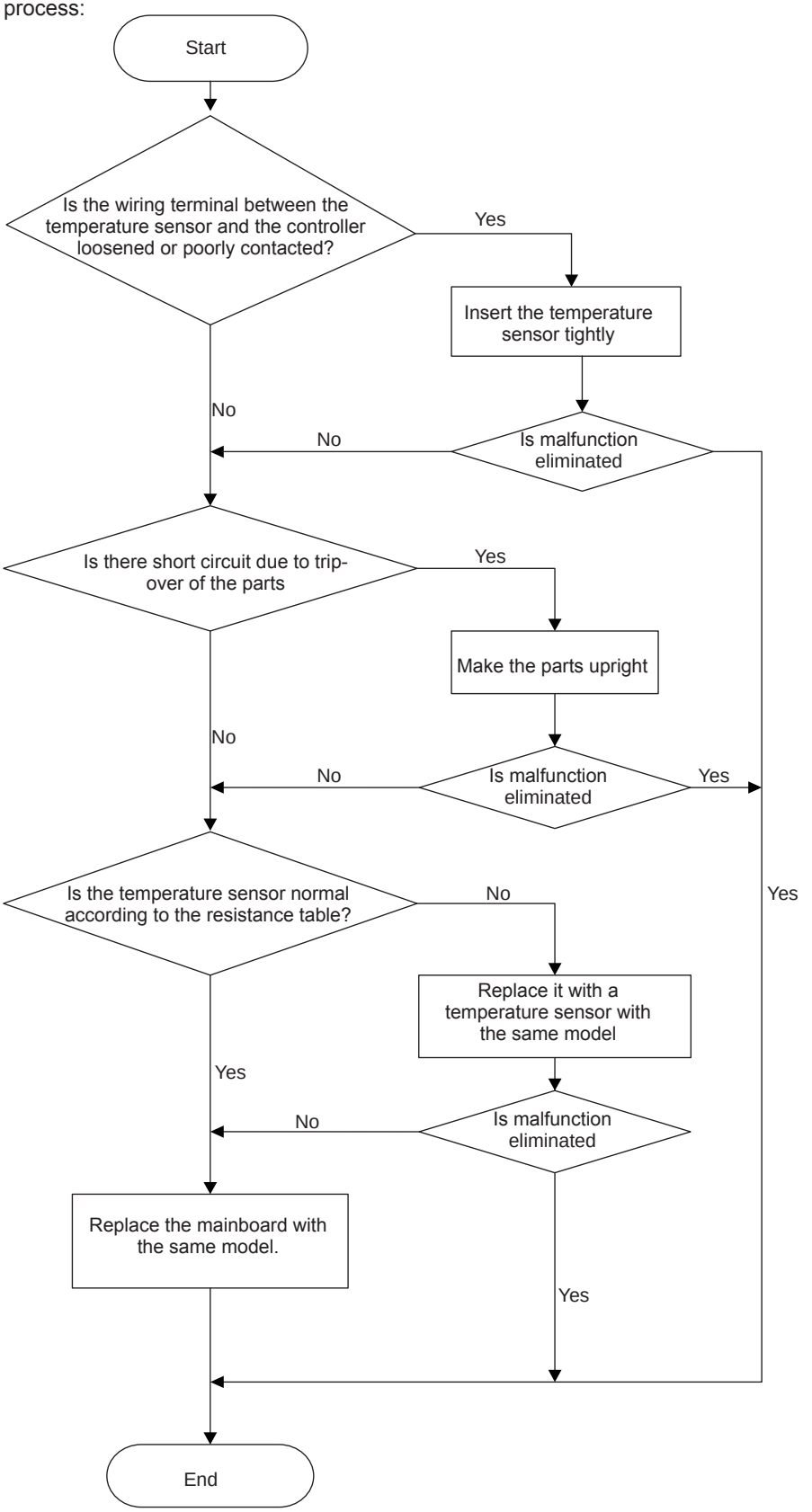
9.2 Procedure of Troubleshooting

(1) Malfunction of Temperature Sensor

Main detection points:

- Is the wiring terminal between the temperature sensor and the controller loosened or poorly contacted?
- Is there short circuit due to trip-over of the parts?
- Is the temperature sensor broken?
- Is mainboard broken?

Malfunction diagnosis process:

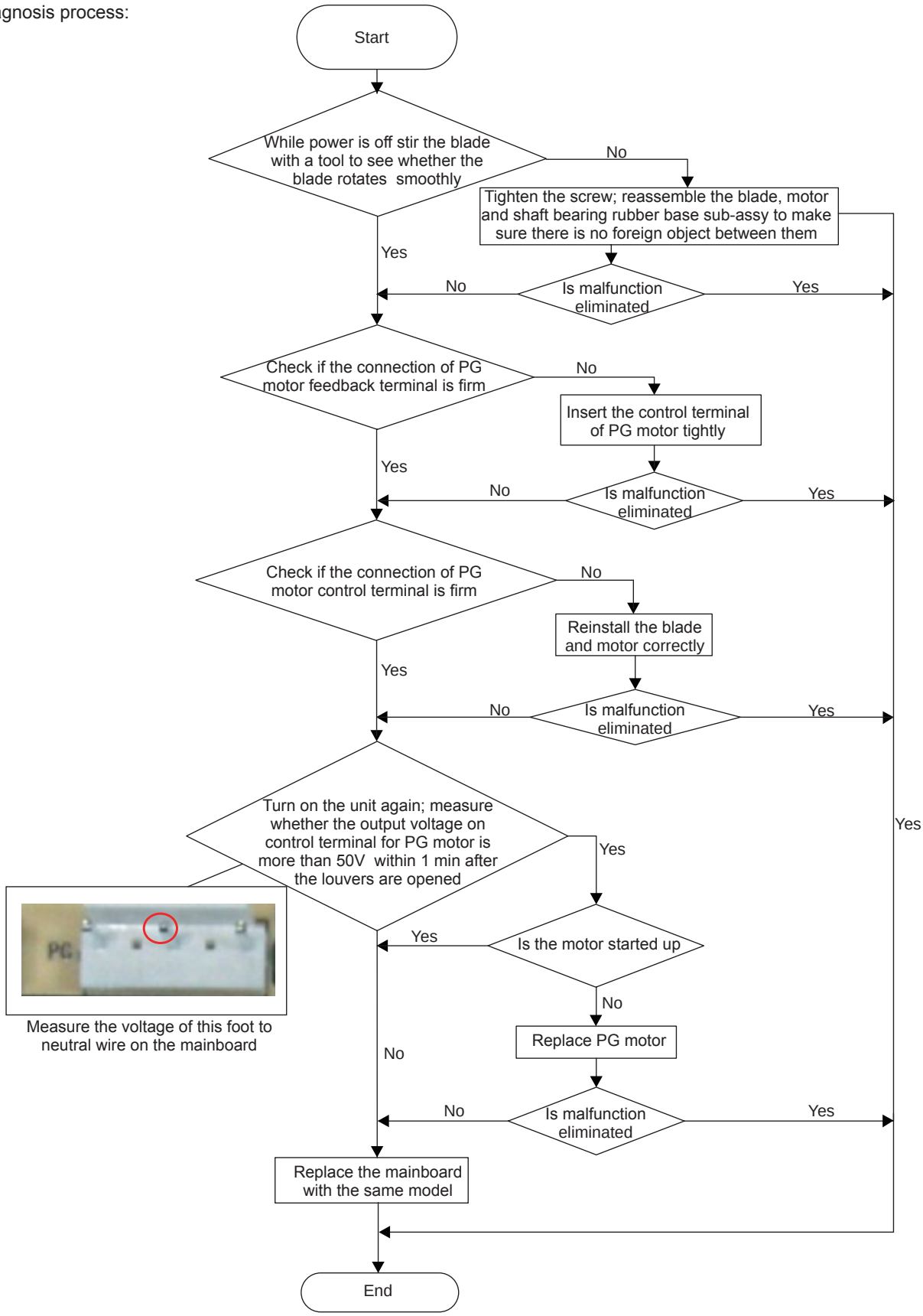


(2) Malfunction of Blocked Protection of IDU Fan Motor

Main detection points:

- Smoothlyls the control terminal of PG motor connected tightly?
- Smoothlyls the feedback interface of PG motor connected tightly?
- The fan motor can't operate?
- The motor is broken?
- Detectioncircuit of the mainboard is defined abnormal?

Malfunction diagnosis process:

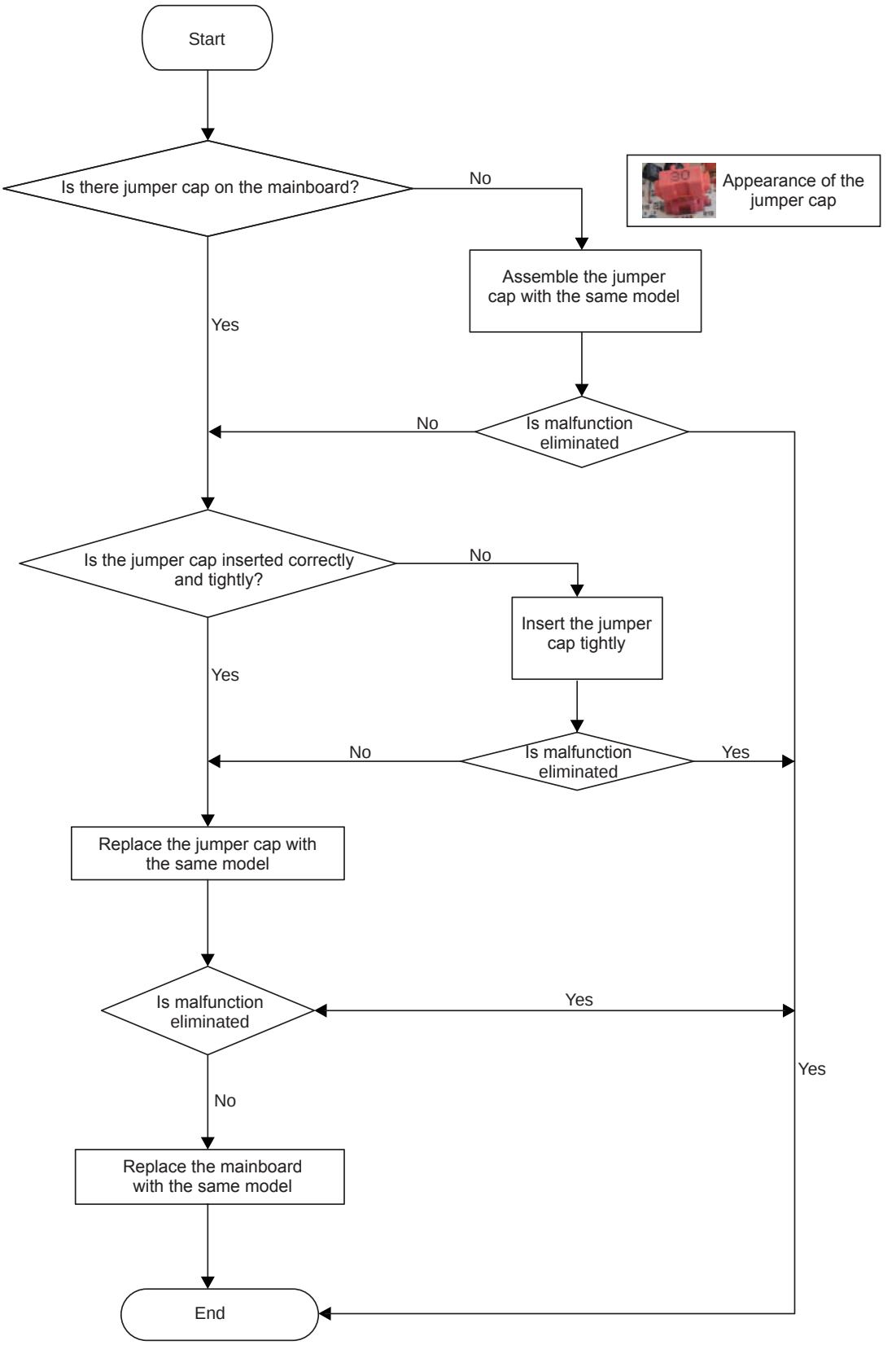

Start
While power is off stir the blade with a tool to see whether the blade rotates smoothly
No
Tighten the screw; reassemble the blade, motor and shaft bearing rubber base sub-assy to make sure there is no foreign object between them
Yes
No
Is malfunction eliminated
Yes
Check if the connection of PG motor feedback terminal is firm
No
Insert the control terminal of PG motor tightly
Yes
No
Is malfunction eliminated
Yes
Check if the connection of PG motor control terminal is firm
No
Reinstall the blade and motor correctly
Yes
No
Is malfunction eliminated
Yes
Turn on the unit again; measure whether the output voltage on control terminal for PG motor is more than 50V within 1 min after the louvers are opened
Yes
Yes
Is the motor started up
No
Replace PG motor
No
No
Is malfunction eliminated
Yes
Replace the mainboard with the same model
End
Yes
PG
Measure the voltage of this foot to neutral wire on the mainboard

(3) Malfunction of Protection of Jumper Cap

Main detection points:

- Is there jumper cap on the mainboard?
- Is the jumper cap inserted correctly and tightly?
- The jumper is broken?
- The motor is broken?
- Detection circuit of the mainboard is defined abnormal?

Malfunction diagnosis process:



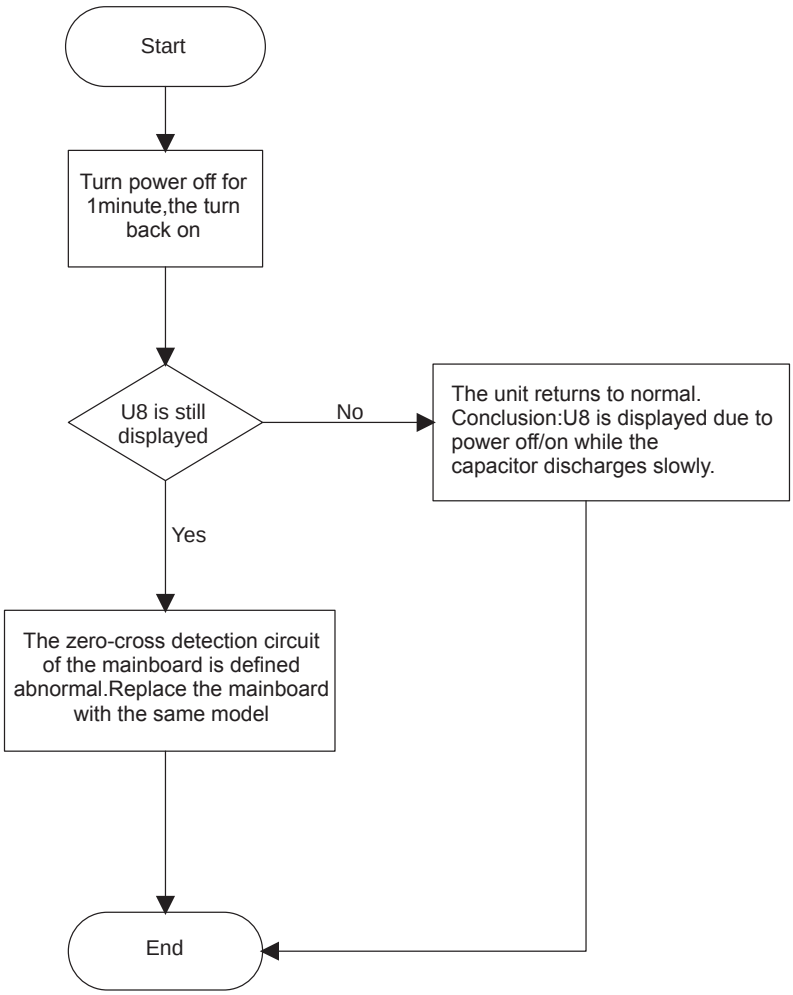
(4) Malfunction of Zero-crossing Inspection Circuit Malfunction of the IDU Fan Motor

Main detection points:

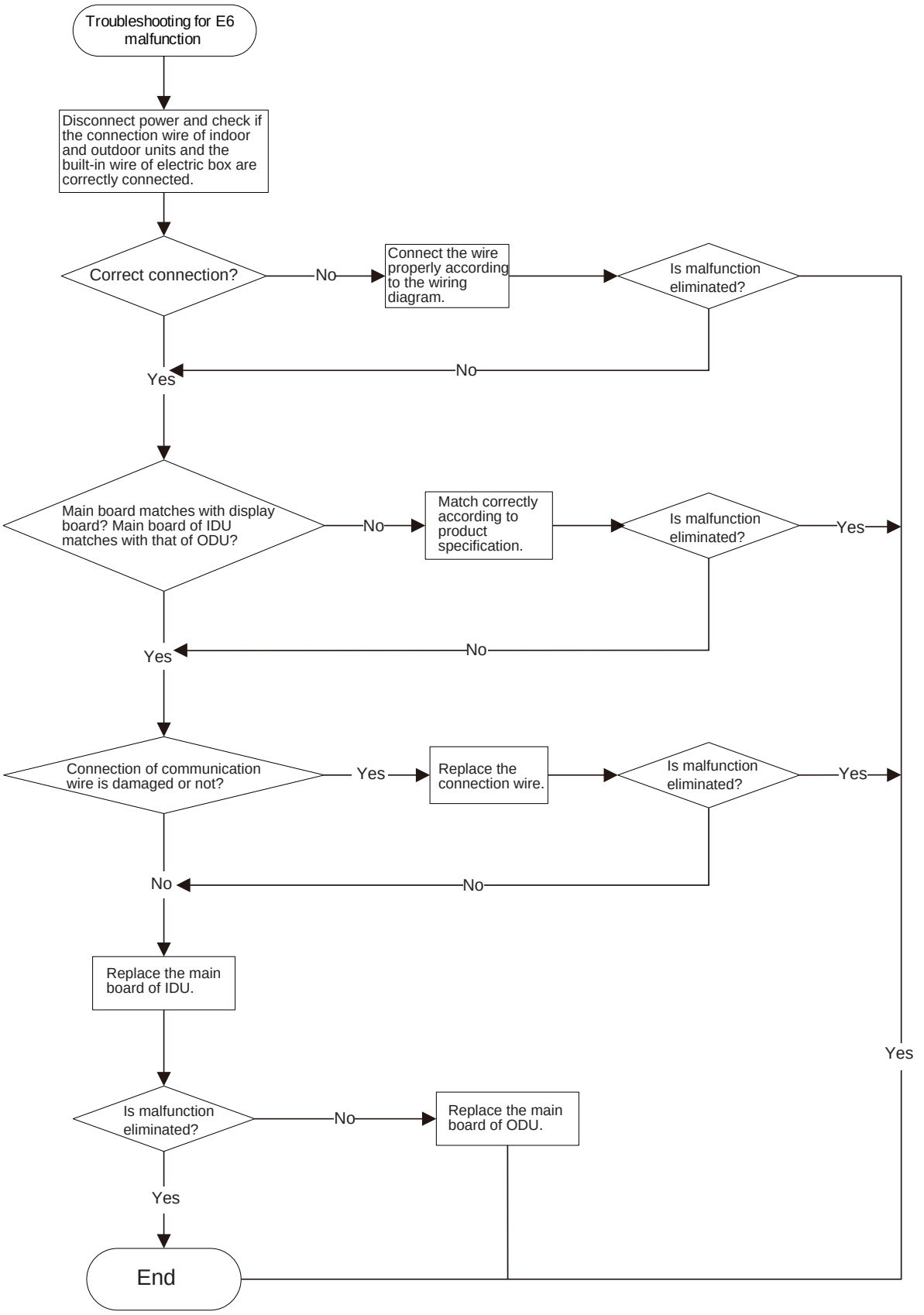
● Instant energization afte de-energization while the capacitordischarges slowly?

● The zero-cross detectioncircuit of the mainboard is defined abnormal?

Malfunction diagnosis process:


Start
Turn power off for 1minute,the turn back on
U8 is still displayed
No
The unit returns to normal. Conclusion:U8 is displayed due to power off/on while the capacitor discharges slowly.
Yes
The zero-cross detection circuit of the mainboard is defined abnormal.Replace the mainboard with the same model
End

(5) Communication Malfunction



Outdoot Unit

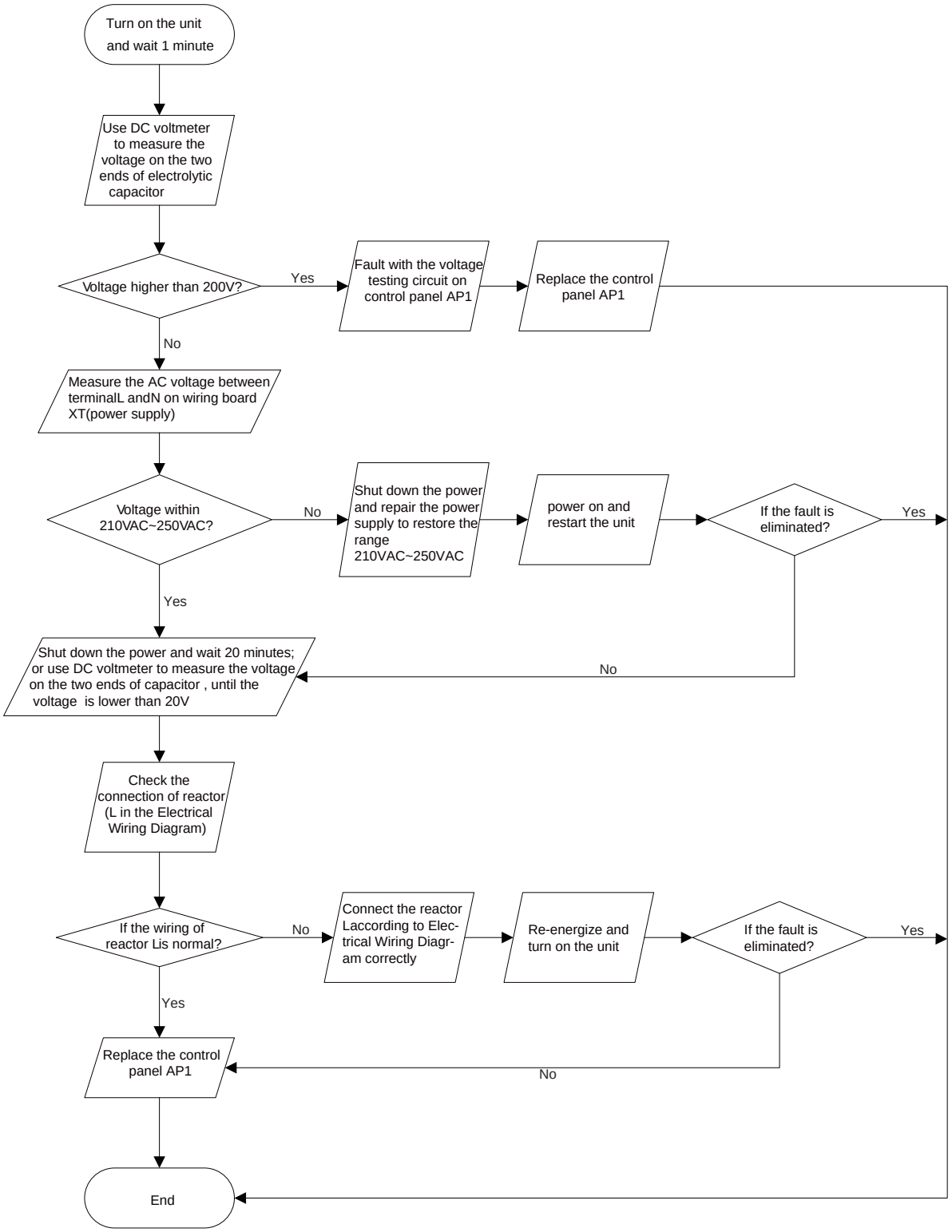
(1) Capacitor charge fault (Fault with outdoor unit) (AP1 below refers to the outdoor control panel)

Main Check Points:

●Use AC voltmeter to check if the voltage between terminal L and N on the wiring board is within 210VAC~240VAC.

●Is the reactor (L) correctly connected? Is the connection loose or fallen? Is the reactor (L) damaged?

Fault diagnosis process:


Turn on the unit and wait 1 minute
Use DC voltmeter to measure the voltage on the two ends of electrolytic capacitor
Voltage higher than 200V?
Yes
Fault with the voltage testing circuit on control panel AP1
Replace the control panel AP1
No
Measure the AC voltage between terminalL andN on wiring board XT(power supply)
Voltage within 210VAC~250VAC?
No
Shut down the power and repair the power supply to restore the range 210VAC~250VAC
power on and restart the unit
If the fault is eliminated?
Yes
Yes
Shut down the power and wait 20 minutes; or use DC voltmeter to measure the voltage on the two ends of capacitor , until the voltage is lower than 20V
No
Check the connection of reactor (L in the Electrical Wiring Diagram)
If the wiring of reactor Lis normal?
No
Connect the reactor Laccording to Electrical Wiring Diagram correctly
Re-energize and turn on the unit
If the fault is eliminated?
Yes
Yes
Replace the control panel AP1
No
End

(2) IPM Protection, Out-of-step Fault, Compressor Phase Overcurrent (AP1 below refers to the outdoor control panel)

Main check points:

●Is the connection between control panel AP1 and compressor COMP secure? Loose? Is the connection in correct order?

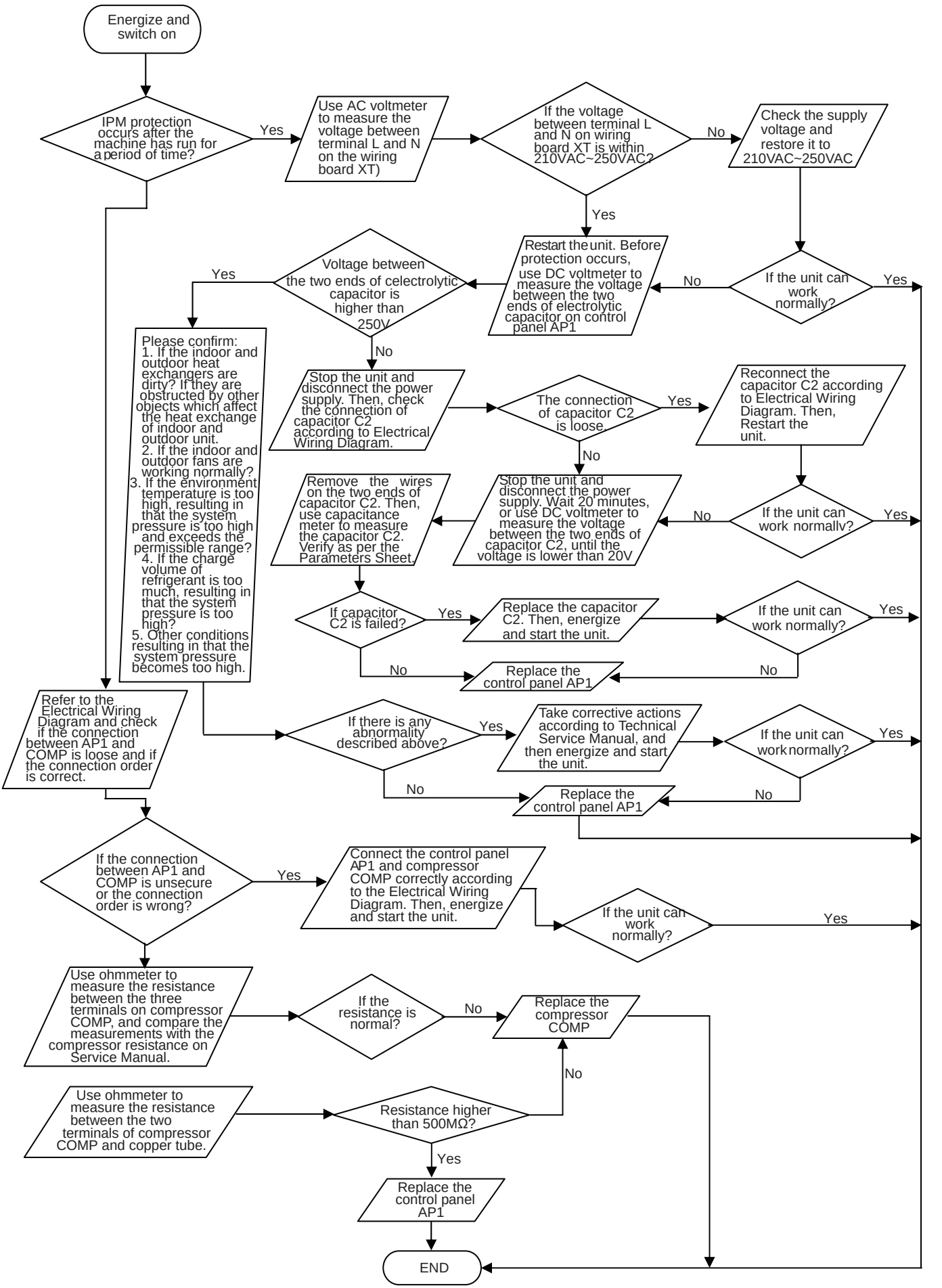
●Is the voltage input of the machine within normal range? (Use AC voltmeter to measure the voltage between terminal L and N on the wiring board XT)

●Is the compressor coil resistance normal? Is the insulation of compressor coil against the copper tube in good condition?

●Is the working load of the machine too high? Is the radiation good?

●Is the charge volume of refrigerant correct?

Fault diagnosis process:


Energize and switch on
IPM protection occurs after the machine has run for a period of time?
Yes
Use AC voltmeter to measure the voltage between terminal L and N on the wiring board XT)
If the voltage between terminal L and N on wiring board XT is within 210VAC~250VAC?
No
Check the supply voltage and restore it to 210VAC~250VAC
Yes
Restart the unit. Before protection occurs, use DC voltmeter to measure the voltage between the two ends of electrolytic capacitor on control panel AP1
No
If the unit can work normally?
Yes
Voltage between the two ends of celectrolytic capacitor is higher than 250V
Yes
No
Please confirm:
1. If the indoor and outdoor heat exchangers are dirty? If they are obstructed by other objects which affect the heat exchange of indoor and outdoor unit.
2. If the indoor and outdoor fans are working normally?
3. If the environment temperature is too high, resulting in that the system pressure is too high and exceeds the permissible range?
4. If the charge volume of refrigerant is too much, resulting in that the system pressure is too high?
5. Other conditions resulting in that the system pressure becomes too high.
Stop the unit and disconnect the power supply. Then, check the connection of capacitor C2 according to Electrical Wiring Diagram.
The connection of capacitor C2 is loose.
Yes
Reconnect the capacitor C2 according to Electrical Wiring Diagram. Then, Restart the unit.
No
Remove the wires on the two ends of capacitor C2. Then, use capacitance meter to measure the capacitor C2. Verify as per the Parameters Sheet.
Stop the unit and disconnect the power supply. Wait 20 minutes, or use DC voltmeter to measure the voltage between the two ends of capacitor C2, until the voltage is lower than 20V
No
If the unit can work normallv?
Yes
If capacitor C2 is failed?
Yes
Replace the capacitor C2. Then, energize and start the unit.
If the unit can work normally?
Yes
No
Replace the control panel AP1
No
Refer to the Electrical Wiring Diagram and check if the connection between AP1 and COMP is loose and if the connection order is correct.
If there is any abnormality described above?
Yes
Take corrective actions according to Technical Service Manual, and then energize and start the unit.
If the unit can work normally?
Yes
No
Replace the control panel AP1
No
If the connection between AP1 and COMP is unsecure or the connection order is wrong?
Yes
Connect the control panel AP1 and compressor COMP correctly according to the Electrical Wiring Diagram. Then, energize and start the unit.
If the unit can work normally?
Yes
Use ohmmeter to measure the resistance between the three terminals on compressor COMP, and compare the measurements with the compressor resistance on Service Manual.
If the resistance is normal?
No
Replace the compressor COMP
No
Use ohmmeter to measure the resistance between the two terminals of compressor COMP and copper tube.
Resistance higher than 500MΩ?
Yes
Replace the control panel AP1
END

(3) High temperature and overload protection diagnosis (AP1 hereinafter refers to the control board of the outdoor unit)

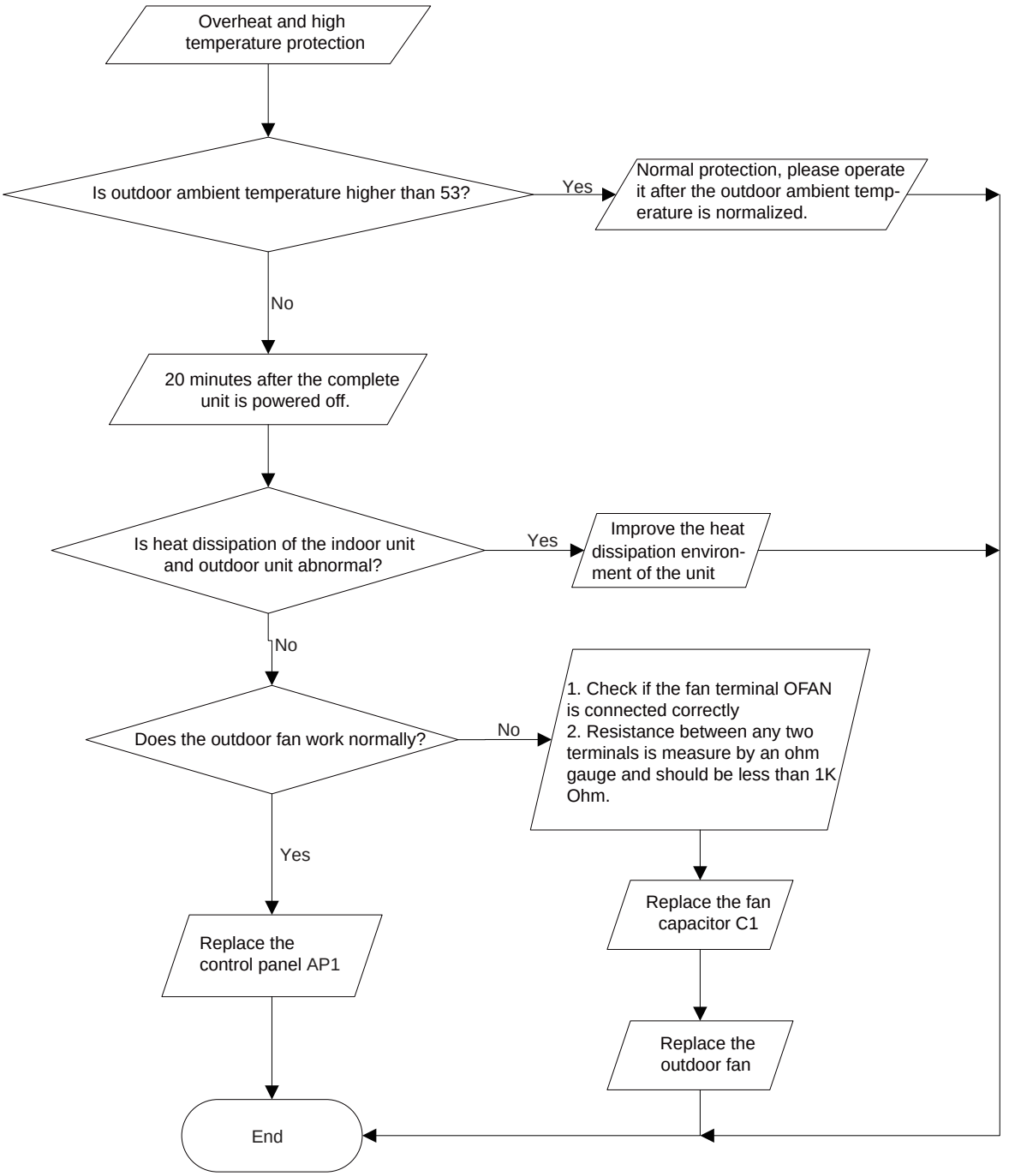
Mainly detect:

●Is outdoor ambient temperature in normal range?

●Are the outdoor and indoor fans operating normally?

●Is the heat dissipation environment inside and outside the unit good?

Fault diagnosis process:


Overheat and high temperature protection
Is outdoor ambient temperature higher than 53?
Yes
Normal protection, please operate it after the outdoor ambient temperature is normalized.
No
20 minutes after the complete unit is powered off.
Is heat dissipation of the indoor unit and outdoor unit abnormal?
Yes
Improve the heat dissipation environment of the unit
No
Does the outdoor fan work normally?
No
1. Check if the fan terminal OFAN is connected correctly
2. Resistance between any two terminals is measure by an ohm gauge and should be less than 1K Ohm.
Yes
Replace the fan capacitor C1
Replace the control panel AP1
Replace the outdoor fan
End

(4) Start-up failure (following AP1 for outdoor unit control board)

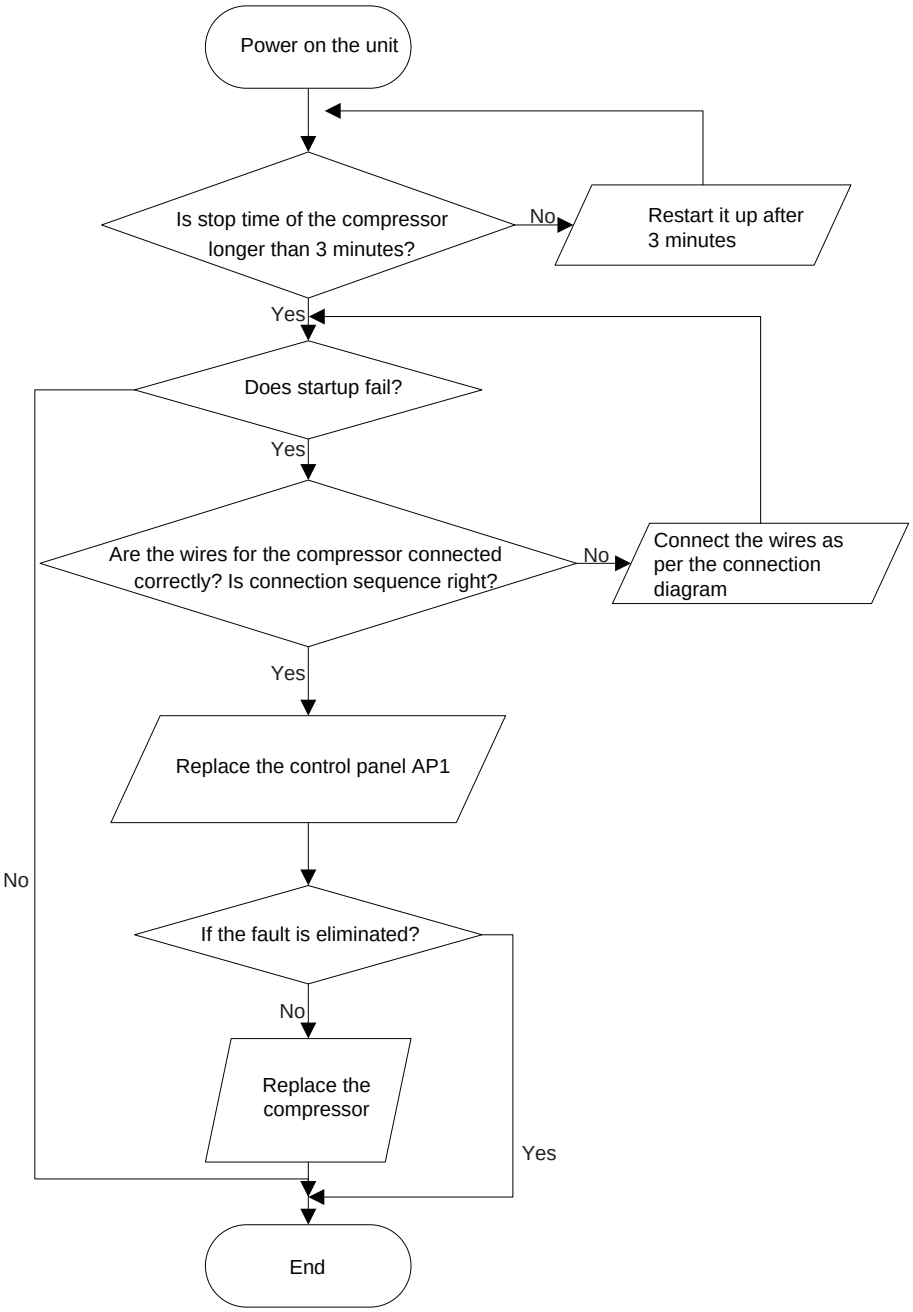
Mainly detect:

●Whether the compressor wiring is connected correct?

●Is compressor broken?

●Is time for compressor stopping enough?

Fault diagnosis process:



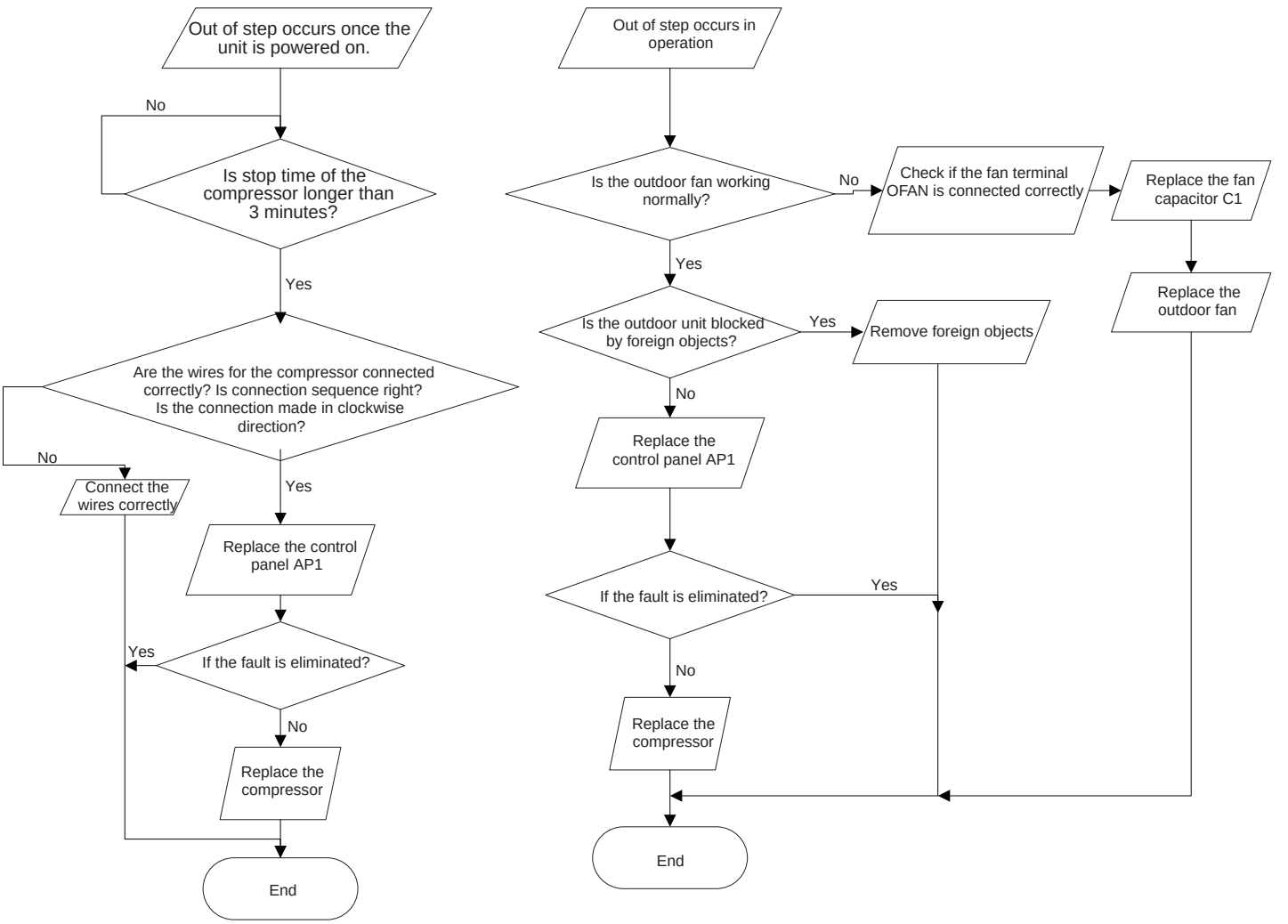
(5) Out of step diagnosis for the compressor (AP1 hereinafter refers to the control board of the outdoor unit)

Mainly detect:

●Is the system pressure too high?

●Is the input voltage too low?

Fault diagnosis process:


Out of step occurs once the unit is powered on.
No
Is stop time of the compressor longer than 3 minutes?
Yes
Are the wires for the compressor connected correctly? Is connection sequence right? Is the connection made in clockwise direction?
No
Connect the wires correctly
Yes
Replace the control panel AP1
If the fault is eliminated?
Yes
No
Replace the compressor
End
Out of step occurs in operation
Is the outdoor fan working normally?
No
Check if the fan terminal OFAN is connected correctly
Replace the fan capacitor C1
Replace the outdoor fan
Yes
Is the outdoor unit blocked by foreign objects?
Yes
Remove foreign objects
No
Replace the control panel AP1
If the fault is eliminated?
Yes
No
Replace the compressor
End

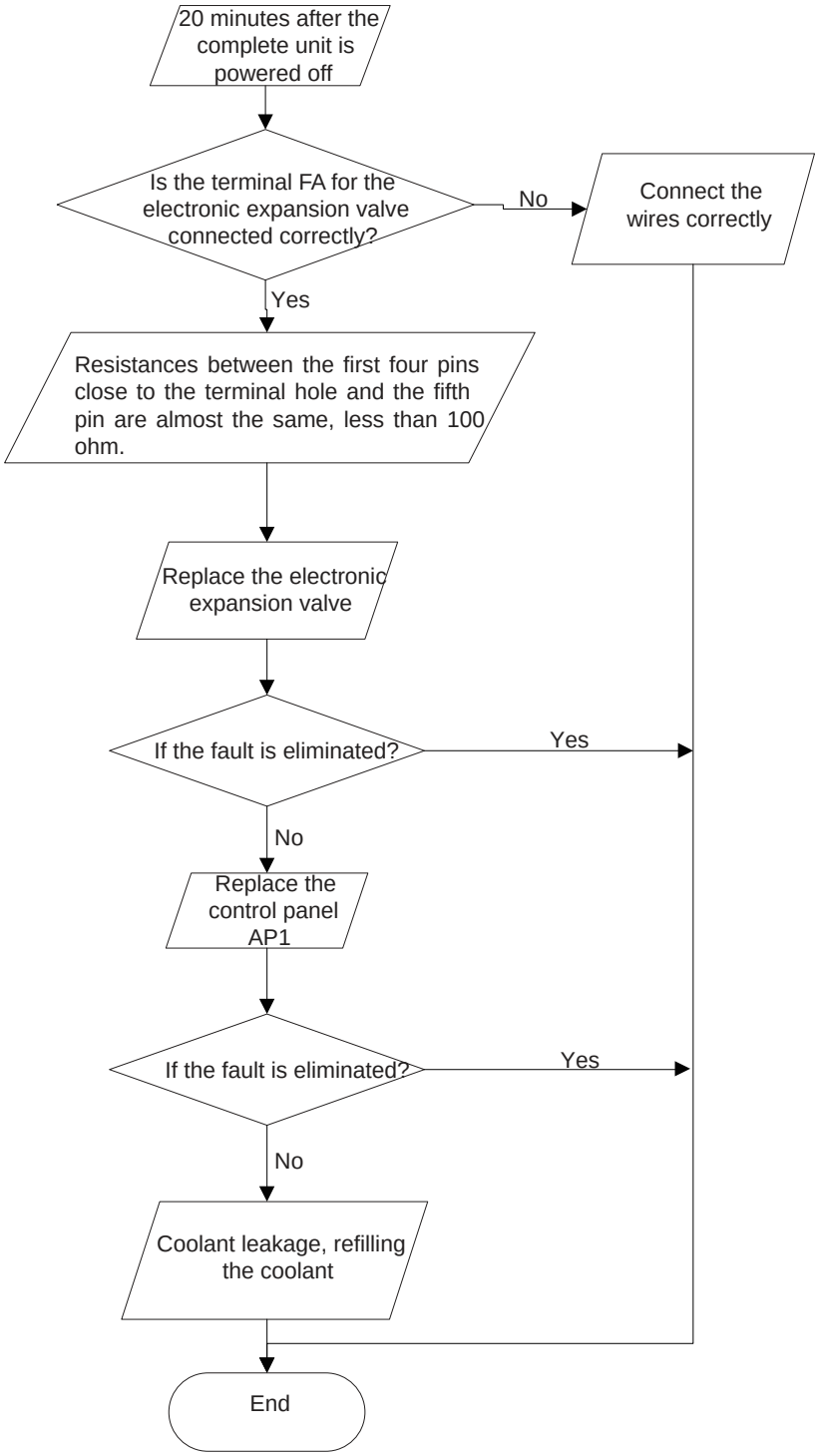
(6) Overload and air exhaust malfunction diagnosis (following AP1 for outdoor unit control board)

Mainly detect:

●Is the PMV connected well or not? Is PMV damaged?

●Is refrigerant leaked?

Fault diagnosis process:

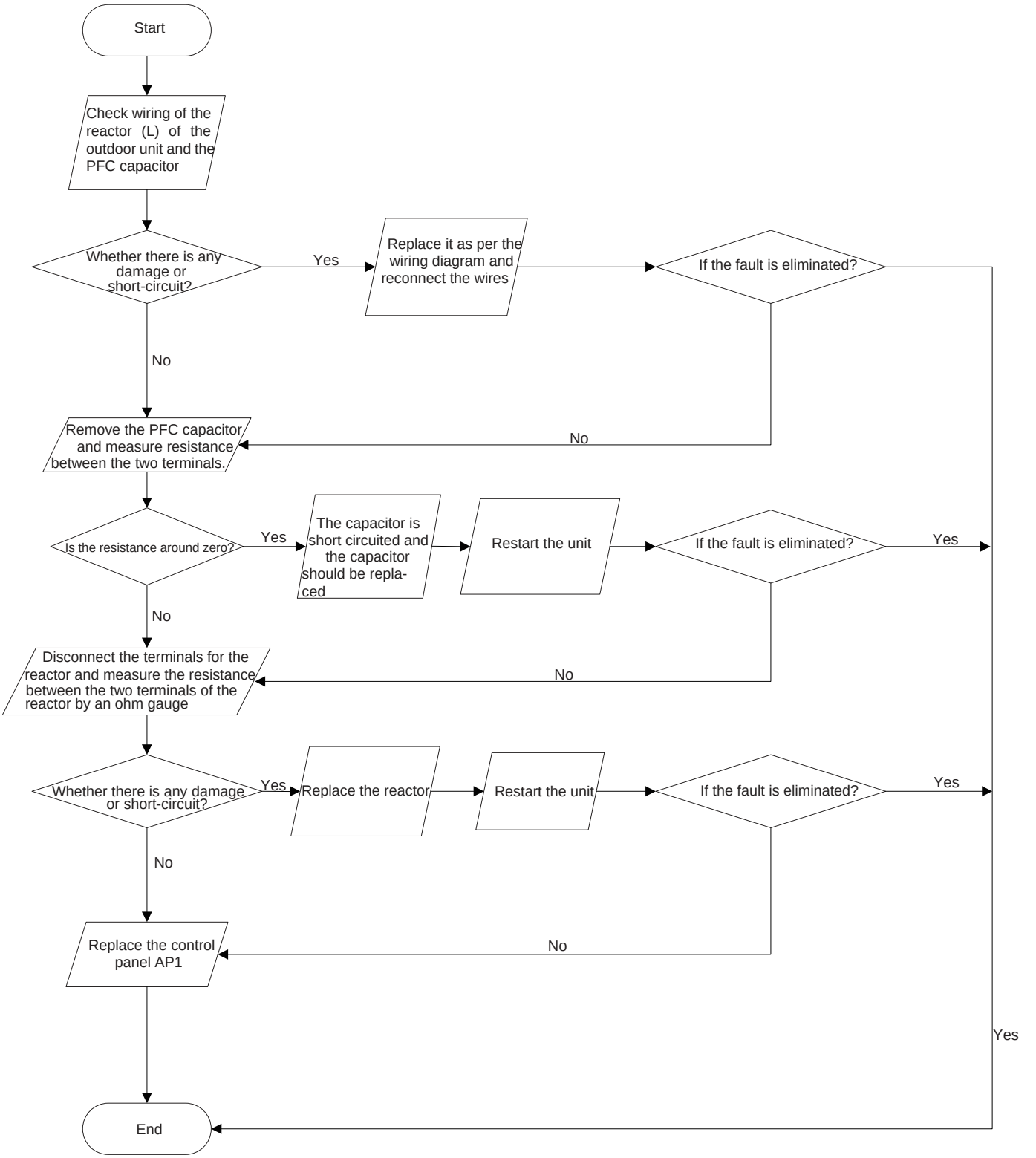

20 minutes after the complete unit is powered off
Is the terminal FA for the electronic expansion valve connected correctly?
No
Connect the wires correctly
Yes
Resistances between the first four pins close to the terminal hole and the fifth pin are almost the same, less than 100 ohm.
Replace the electronic expansion valve
If the fault is eliminated?
Yes
No
Replace the control panel AP1
If the fault is eliminated?
Yes
No
Coolant leakage, refilling the coolant
End

(7) Power factor correct or (PFC) fault (a fault of outdoor unit) (AP1 hereinafter refers to the control board of the outdoor unit)

Mainly detect:

●Check if the reactor (L) of the outdoor unit and the PFC capacitor are broken

Fault diagnosis process:


Start
Check wiring of the reactor (L) of the outdoor unit and the PFC capacitor
Whether there is any damage or short-circuit?
Yes
Replace it as per the wiring diagram and reconnect the wires
If the fault is eliminated?
No
Remove the PFC capacitor and measure resistance between the two terminals.
No
Is the resistance around zero?
Yes
The capacitor is short circuited and the capacitor should be replaced
Restart the unit
If the fault is eliminated?
Yes
No
Disconnect the terminals for the reactor and measure the resistance between the two terminals of the reactor by an ohm gauge
No
Whether there is any damage or short-circuit?
Yes
Replace the reactor
Restart the unit
If the fault is eliminated?
Yes
No
Replace the control panel AP1
No
Yes
End

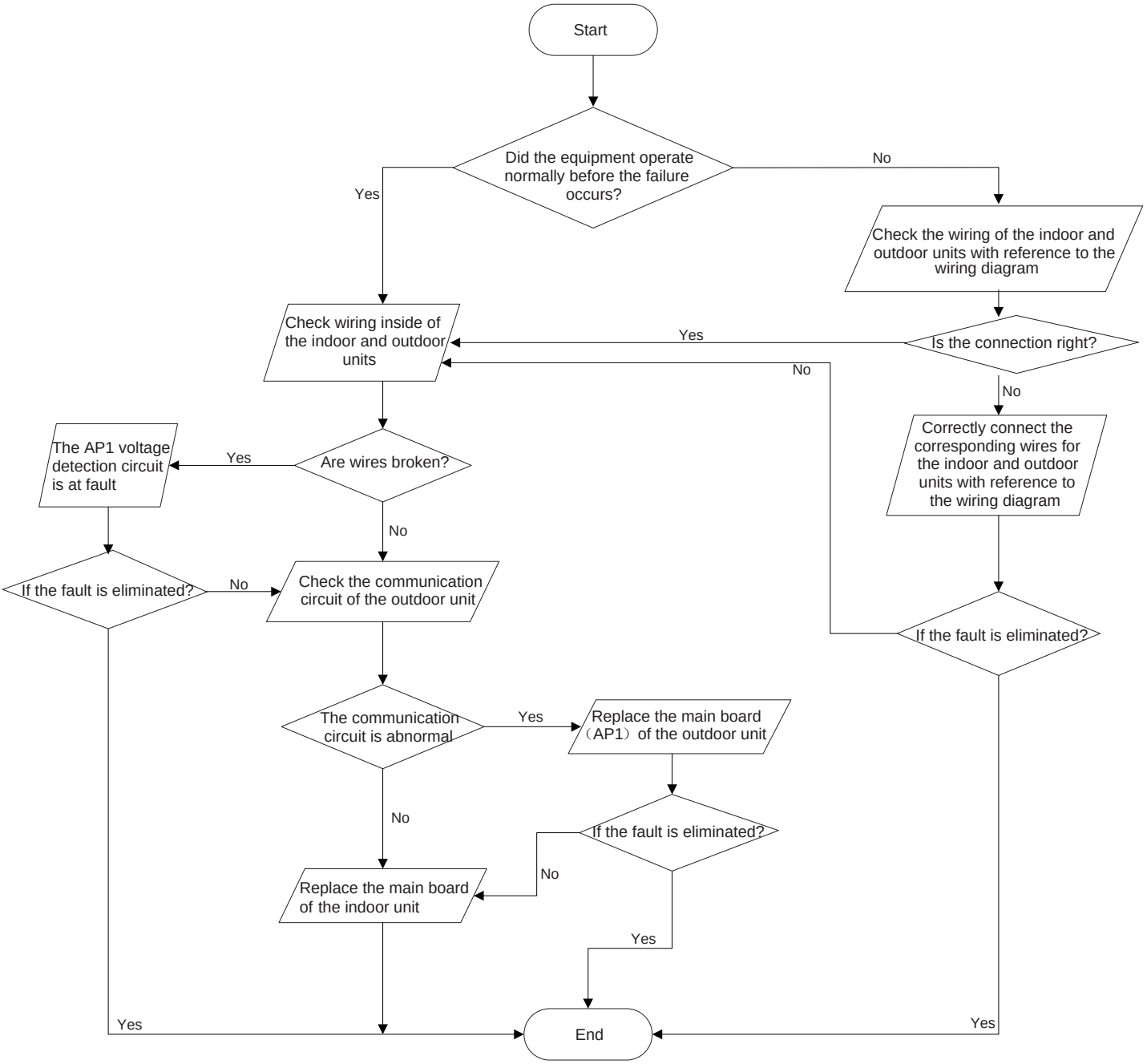
(8) Communication malfunction: (following AP1 for outdoor unit control board)

Mainly detect:

●Is there any damage for the indoor unit mainboard communication circuit? Is communication circuit damaged?

●Detect the indoor and outdoor units connection wire and indoor and outdoor units inside wiring is connect well or not, if is there any damage?

Fault diagnosis process:

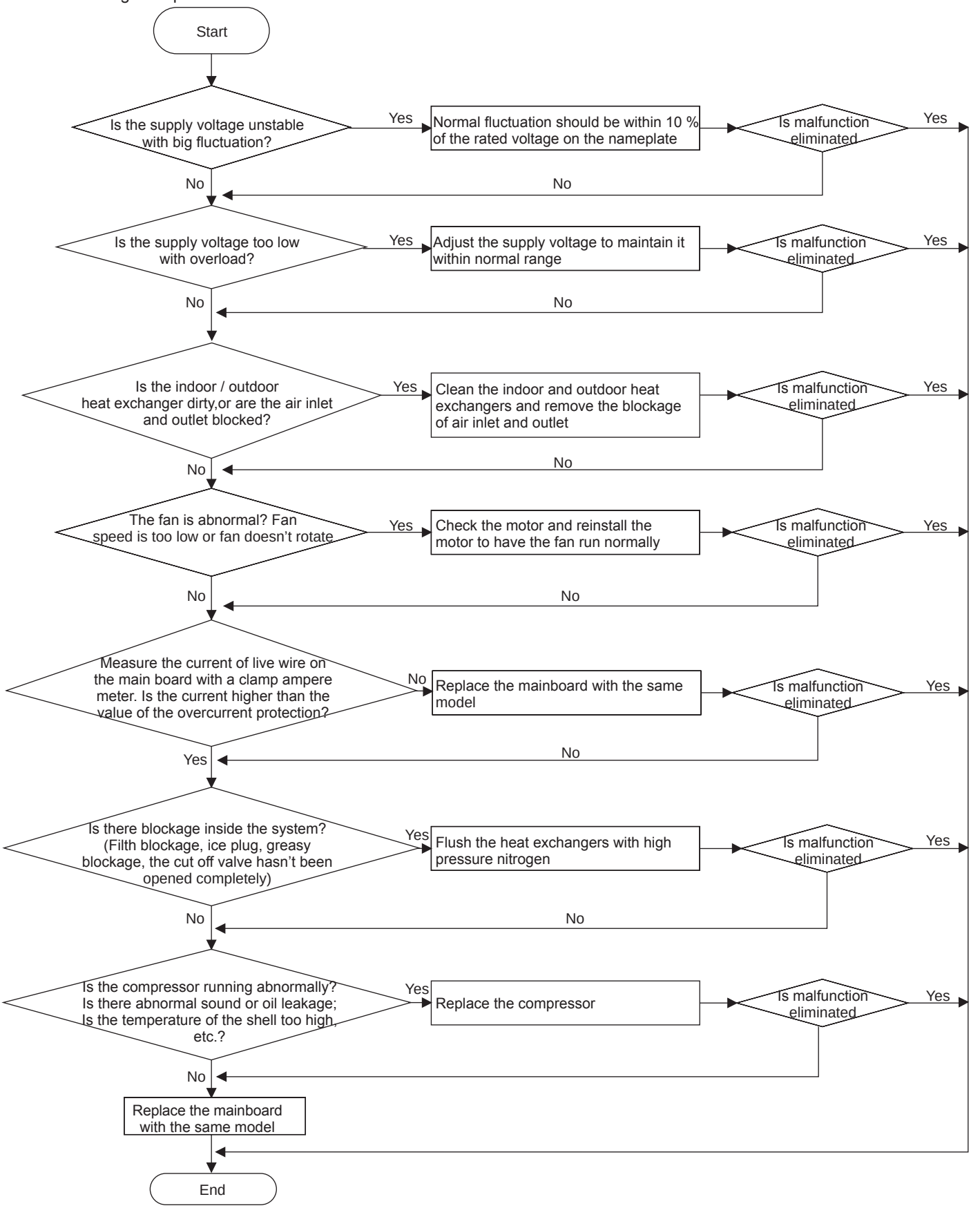

Start
Did the equipment operate normally before the failure occurs?
Yes
No
Check the wiring of the indoor and outdoor units with reference to the wiring diagram
Is the connection right?
Yes
No
Check wiring inside of the indoor and outdoor units
Correctly connect the corresponding wires for the indoor and outdoor units with reference to the wiring diagram
Are wires broken?
Yes
The AP1 voltage detection circuit is at fault
No
If the fault is eliminated?
No
Check the communication circuit of the outdoor unit
If the fault is eliminated?
The communication circuit is abnormal
Yes
Replace the main board （AP1） of the outdoor unit
No
If the fault is eliminated?
No
Replace the main board of the indoor unit
Yes
Yes
End
Yes

(9) Malfunction of Overcurrent Protection

Main detection points:

- Is the supply voltage unstable with big fluctuation?
- Is the supply voltage too low with overload?
- Hardware trouble?

Malfunction diagnosis process:


Start
Is the supply voltage unstable with big fluctuation?
Yes
Normal fluctuation should be within 10 % of the rated voltage on the nameplate
Is malfunction eliminated
Yes
No
No
Is the supply voltage too low with overload?
Yes
Adjust the supply voltage to maintain it within normal range
Is malfunction eliminated
Yes
No
No
Is the indoor / outdoor heat exchanger dirty,or are the air inlet and outlet blocked?
Yes
Clean the indoor and outdoor heat exchangers and remove the blockage of air inlet and outlet
Is malfunction eliminated
Yes
No
No
The fan is abnormal? Fan speed is too low or fan doesn't rotate
Yes
Check the motor and reinstall the motor to have the fan run normally
Is malfunction eliminated
Yes
No
No
Measure the current of live wire on the main board with a clamp ampere meter. Is the current higher than the value of the overcurrent protection?
No
Replace the mainboard with the same model
Is malfunction eliminated
Yes
Yes
No
Is there blockage inside the system? (Filth blockage, ice plug, greasy blockage, the cut off valve hasn't been opened completely)
Yes
Flush the heat exchangers with high pressure nitrogen
Is malfunction eliminated
Yes
No
No
Is the compressor running abnormally? Is there abnormal sound or oil leakage; Is the temperature of the shell too high, etc.?
Yes
Replace the compressor
Is malfunction eliminated
Yes
No
Replace the mainboard with the same model
End

9.3 Maintenance Method for Normal Malfunction

1. Air Conditioner Can't be Started Up

Possible Causes	Discriminating Method (Air conditioner Status)	Troubleshooting
No power supply, or poor connection for power plug	After energization, operation indicator isn't bright and the buzzer can't give out sound	Confirm whether it's due to power failure. If yes, wait for power recovery. If not, check power supply circuit and make sure the power plug is connected well.
Wrong wire connection between indoor unit and outdoor unit, or poor connection for wiring terminals	Under normal power supply circumstances, operation indicator isn't bright after energization	Check the circuit according to circuit diagram and connect wires correctly. Make sure all wiring terminals are connected firmly
Electric leakage for air conditioner	After energization, room circuit breaker trips off at once	Make sure the air conditioner is grounded reliably Make sure wires of air conditioner is connected correctly Check the wiring inside air conditioner. Check whether the insulation layer of power cord is damaged; if yes, place the power cord.
Model selection for air switch is improper	After energization, air switch trips off	Select proper air switch
Malfunction of remote controller	After energization, operation indicator is bright, while no display on remote controller or buttons have no action.	Replace batteries for remote controller Repair or replace remote controller

2. Poor Cooling (Heating) for Air Conditioner

Possible Causes	Discriminating Method (Air conditioner Status)	Troubleshooting
Set temperature is improper	Observe the set temperature on remote controller	Adjust the set temperature
Rotation speed of the IDU fan motor is set too low	Small wind blow	Set the fan speed at high or medium
Filter of indoor unit is blocked	Check the filter to see it's blocked	Clean the filter
Installation position for indoor unit and outdoor unit is improper	Check whether the installation postion is proper according to installation requirement for air conditioner	Adjust the installation position, and install the rainproof and sunproof for outdoor unit
Refrigerant is leaking	Discharged air temperature during cooling is higher than normal discharged wind temperature; Discharged air temperature during heating is lower than normal discharged wind temperature; Unit's pressure is much lower than regulated range	Find out the leakage causes and deal with it. Add refrigerant.
Malfunction of 4-way valve	Blow cold wind during heating	Replace the 4-way valve
Malfunction of capillary	Discharged air temperature during cooling is higher than normal discharged wind temperature; Discharged air temperature during heating is lower than normal discharged wind temperature; Unit't pressure is much lower than regulated range. If refrigerant isn't leaking, part of capillary is blocked	Replace the capillary
Flow volume of valve is insufficient	The pressure of valves is much lower than that stated in the specification	Open the valve completely
Malfunction of horizontal louver	Horizontal louver can't swing	Refer to point 3 of maintenance method for details
Malfunction of the IDU fan motor	The IDU fan motor can't operate	Refer to troubleshooting for H6 for maintenance method in details
Malfunction of the ODU fan motor	The ODU fan motor can't operate	Refer to point 4 of maintenance method for details
Malfunction of compressor	Compressor can't operate	Refer to point 5 of maintenance method for details

3. Horizontal Louver Can't Swing

Possible Causes	Discriminating Method (Air conditioner Status)	Troubleshooting
Wrong wire connection, or poor connection	Check the wiring status according to circuit diagram	Connect wires according to wiring diagram to make sure all wiring terminals are connected firmly
Stepping motor is damaged	Stepping motor can't operate	Repair or replace stepping motor
Main board is damaged	Others are all normal, while horizontal louver can't operate	Replace the main board with the same model

4. ODU Fan Motor Can't Operate

Possible causes	Discriminating method (air conditioner status)	Troubleshooting
Wrong wire connection, or poor connection	Check the wiring status according to circuit diagram	Connect wires according to wiring diagram to make sure all wiring terminals are connected firmly
Capacity of the ODU fan motor is damaged	Measure the capacity of fan capacitor with an universal meter and find that the capacity is out of the deviation range indicated on the nameplate of fan capacitor.	Replace the capacity of fan
Power voltage is a little low or high	Use universal meter to measure the power supply voltage. The voltage is a little high or low	Suggest to equip with voltage regulator
Motor of outdoor unit is damaged	When unit is on, cooling/heating performance is bad and ODU compressor generates a lot of noise and heat.	Change compressor oil and refrigerant. If no better, replace the compressor with a new one

5. Compressor Can't Operate

Possible causes	Discriminating method (air conditioner status)	Troubleshooting
Wrong wire connection, or poor connection	Check the wiring status according to circuit diagram	Connect wires according to wiring diagram to make sure all wiring terminals are connected firmly
Capacity of compressor is damaged	Measure the capacity of fan capacitor with an universal meter and find that the capacity is out of the deviation range indicated on the nameplate of fan capacitor.	Replace the compressor capacitor
Power voltage is a little low or high	Use universal meter to measure the power supply voltage. The voltage is a little high or low	Suggest to equip with voltage regulator
Coil of compressor is burnt out	Use universal meter to measure the resistance between compressor terminals and it's 0	Repair or replace compressor
Cylinder of compressor is blocked	Compressor can't operate	Repair or replace compressor

6. Air Conditioner is Leaking

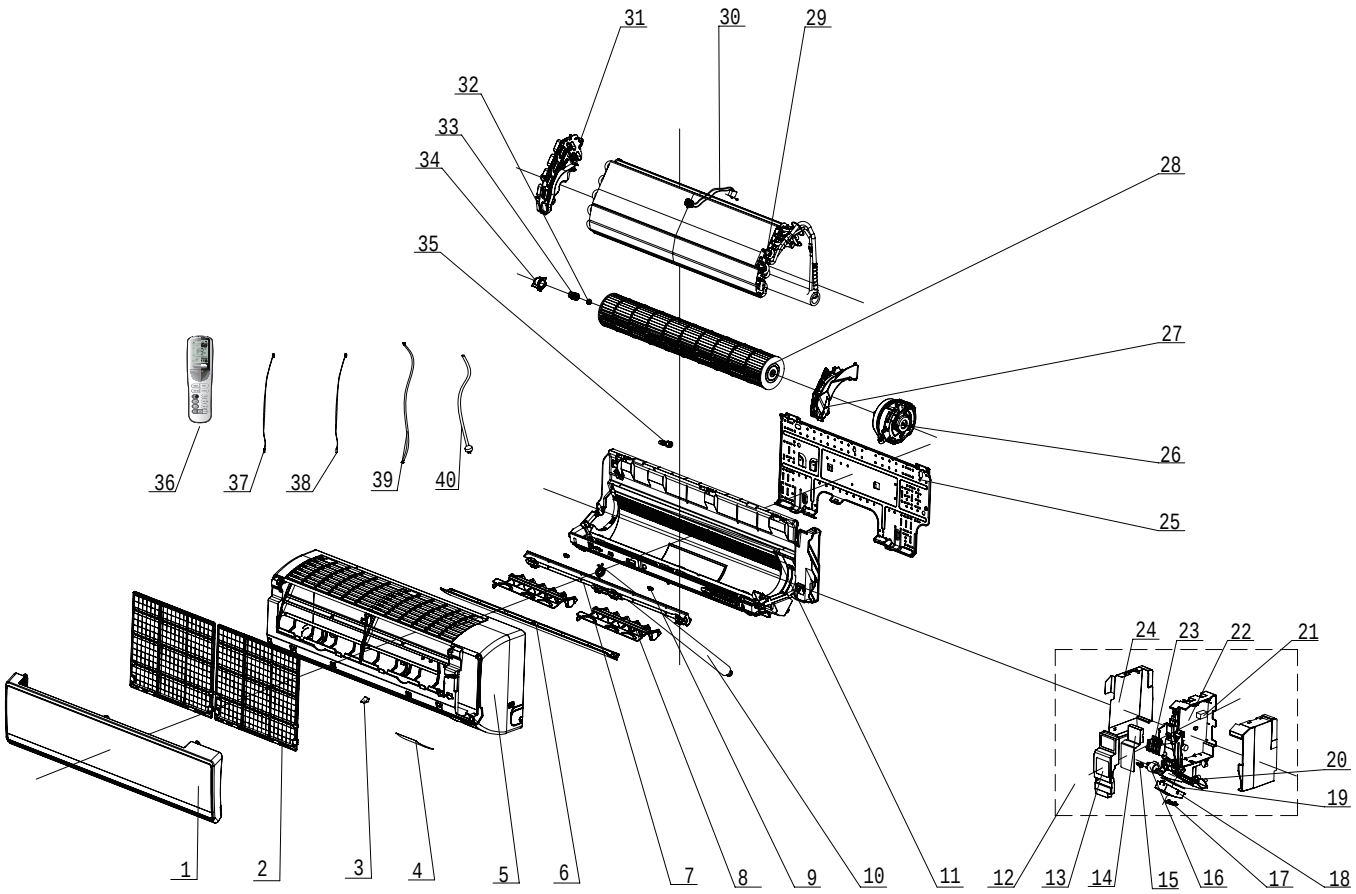
Possible causes	Discriminating method (air conditioner status)	Troubleshooting
Drain pipe is blocked	Water leaking from indoor unit	Eliminate the foreign objects inside the drain pipe
Drain pipe is broken	Water leaking from drain pipe	Replace drain pipe
Wrapping is not tight	Water leaking from the pipe connection place of indoor unit	Wrap it again and bundle it tightly

7. Abnormal Sound and Vibration

Possible causes	Discriminating method (air conditioner status)	Troubleshooting
When turn on or turn off the unit, the panel and other parts will expand and there's abnormal sound	There's the sound of "PAPA"	Normal phenomenon. Abnormal sound will disappear after a few minutes.
When turn on or turn off the unit, there's abnormal sound due to flow of refrigerant inside air conditioner	Water-running sound can be heard	Normal phenomenon. Abnormal sound will disappear after a few minutes.
Foreign objects inside the indoor unit or there're parts touching together inside the indoor unit	There's abnormal sound fro indoor unit	Remove foreign objects. Adjust all parts' position of indoor unit, tighten screws and stick damping plaster between connected parts
Foreign objects inside the outdoor unit or there're parts touching together inside the outdoor unit	There's abnormal sound fro outdoor unit	Remove foreign objects. Adjust all parts' position of outdoor unit, tighten screws and stick damping plaster between connected parts
Short circuit inside the magnetic coil	During heating, the way valve has abnormal electromagnetic sound	Replace magnetic coil
Abnormal shake of compressor	Outdoor unit gives out abnormal sound	Adjust the support foot mat of compressor, tighten the bolts
Abnormal sound inside the compressor	Abnormal sound inside the compressor	If add too much refrigerant during maintenance, please reduce refrigerant properly. Replace compressor for other circumstances.

10. Exploded View and Parts List

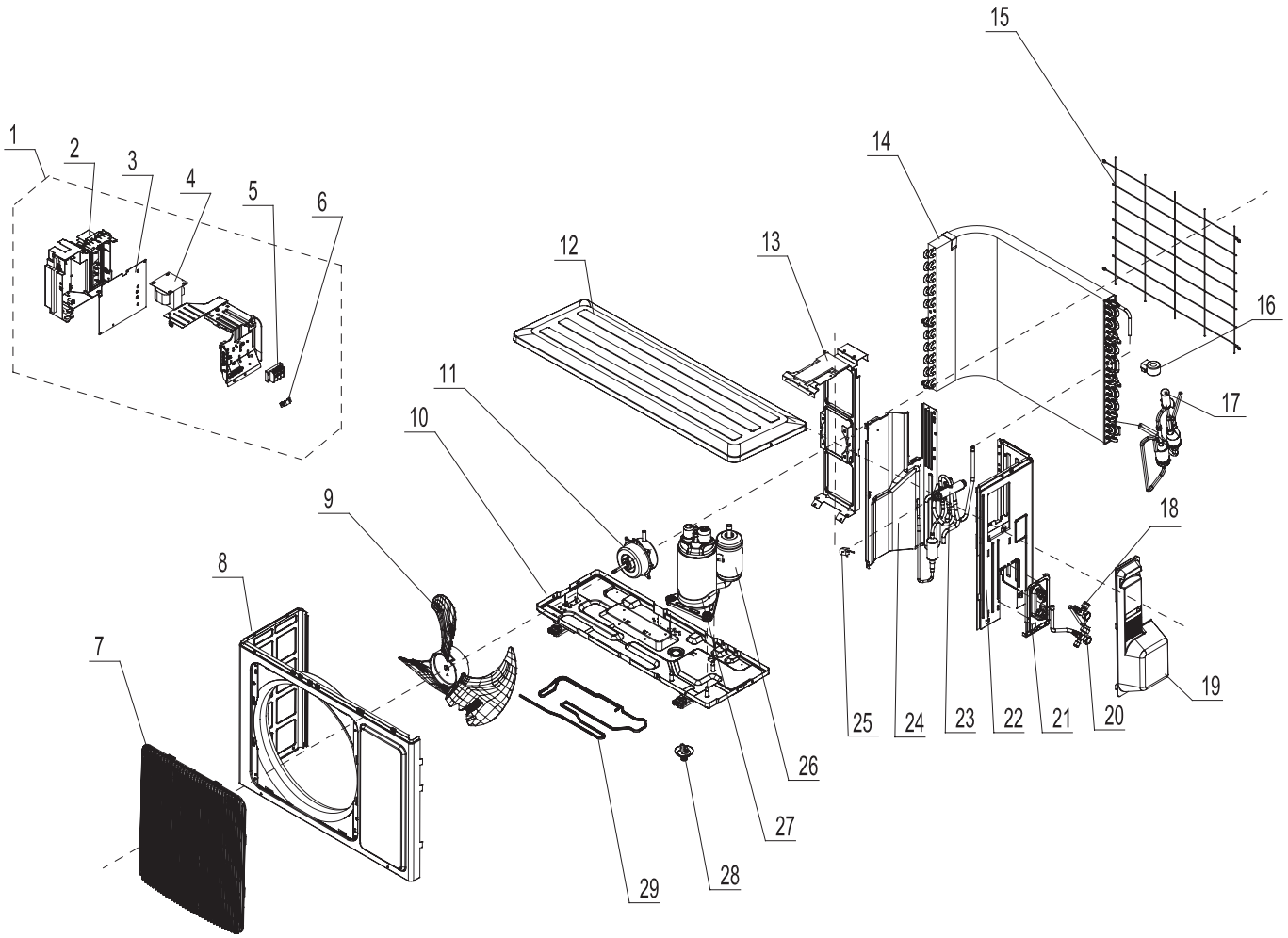
10.1 Indoor Unit



No.	Description	Part Code		Qty
		ASH-09AIE2	ASH-12AIE2	
	Product Code	CB146N38400_L31222	CB146N38500_L31222	
1	Front Panel	27230001300	27230001300	1
2	Filter Sub-Assy	1112208201	1112208201	2
3	Screw Cover	24252019	24252019	1
4	Membrane	63062017	63062017	1
5	Front Case Assy	2001237501	2001237501	1
6	Guide Louver	10512119	10512119	1
7	Helicoid Tongue	26112486	26112486	1
8	Air Louver	10512160	10512160	2
9	Shaft of Guide Louver	1054202001	1054202001	2
10	Drainage Pipe Sub-assy	0523204101	0523204101	1
11	Rear Case assy	2220229501	2220229501	1
12	Electric Box Assy	10000201391	10000201392	1
13	Electric Box Cover	20122106	20122106	1
14	Shield Cover	01592076	01592076	1
15	Crank	73012005	73012005	1
16	Step Motor	1521210701	1521210701	1
17	Indicator Light Cover	22242084	22242084	1
18	Indicator Shield Cover	22242083	22242083	1
19	Display Board	30568112	30568112	1
20	Electric Box	20112086	20112086	1
21	Capacitor CBB61	3301000213	3301000213	1
22	Main Board	30138000407	30138000407	1
23	Terminal Board	42011233	42011233	1
24	Shield Cover	01592076	01592076	1
25	Wall Mounting Frame	0125201801A	0125201801A	1
26	Fan Motor	15012141	15012141	1
27	Motor Press Plate	26112191	26112191	1
28	Cross Flow Fan	10352423	10352423	1
29	Evaporator Assy	01002957	01002958	1
30	Cold Plasma Generator	11140016	11140016	1
31	Evaporator Support	24212108	24212108	1
32	Fan Bearing	76512210	76512210	1
33	Damping Washer Sub-assy	76512011	76512011	1
34	Axile Bush Sub-assy	10542024	10542024	1
35	Pipe Plug (Outlet)	76712020	76712020	1
36	Remote Controller	30510125_L31222	30510125_L31222	1
37	Temperature Sensor	390000453	390000453	1
38	Temperature Sensor	39000305	39000305	1
39	Connecting Cable	400204056	400204056	1
40	Power Cord	/	/	/

Above data is subject to change without notice.

10.2 Outdoor Unit



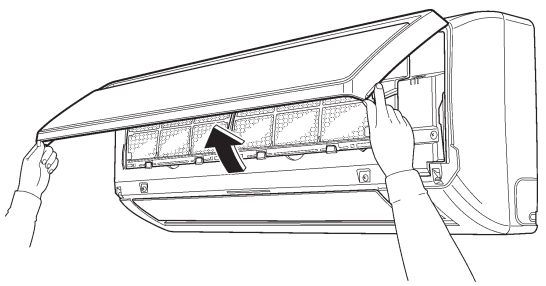
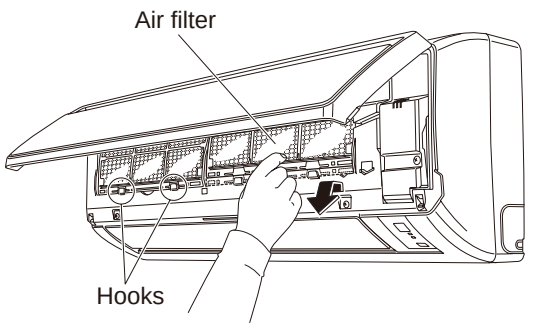
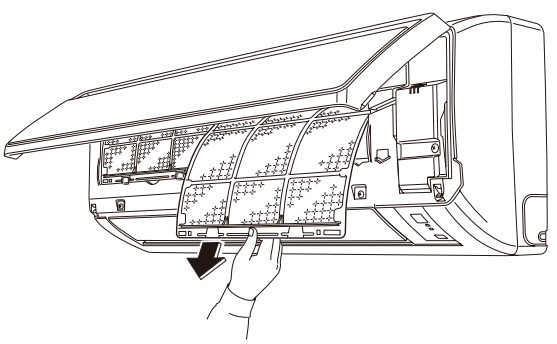
No.	Description	Part Code		Qty
		ASH-09AIE2	ASH-12AIE2	
	Product Code	CB146W36201_L31222	CB146W36101_L31222	
1	Electric Box Assy	10000100119	10000100121	1
2	Electric Box Sub-Assy	10000500050	10000500052	1
3	Main Board	30138000458	30138000459	1
4	Reactor	43130184	43130184	1
5	Terminal Board	42010313	42010313	1
6	Wire Clamp	71010003	71010003	2
7	Front Grill	22413043	22413043	1
8	Front Panel Assy	0153304802	0153304802	1
9	Axial Flow Fan	10333004	10333004	1
10	Chassis Sub-assy	0280330401P	02803304P	1
11	Fan Motor	1501308506	1501308506	1
12	Top Cover Sub-Assy	01253073	01253073	1
13	Motor Support	01703104	0170310401	1
14	Condenser Assy	01100200141	01100200142	1
15	Rear Grill	01473009	01473009	1
16	Electric Expand Valve Fitting	4300876701	4300876701	1
17	Electronic Expansion Valve	07135228	07135228	1
18	Valve	07100003	07100003	1
19	Big Handle	262334332	262334332	1
20	Cut off Valve Assy	07133474	07133474	1
21	Valve Support	0171314201P	0171314201P	1
22	Right Side Plate Sub-Assy	0130317801	0130317801	1
23	4-Way Valve Assy	03073151	03073145	1
24	Clapboard Sub-Assy	0123338502	0123338502	1
25	Magnet Coil	4300040050	4300040050	1
26	Compressor and Fittings	00103896G	00103896G	1
27	Electrical Heater	7661281401	7661281401	1
28	Drainage Connecter	06123401	06123401	1
29	Electrical Heater (Chassis)	7651000414	7651000414	1

Above data is subject to change without notice.

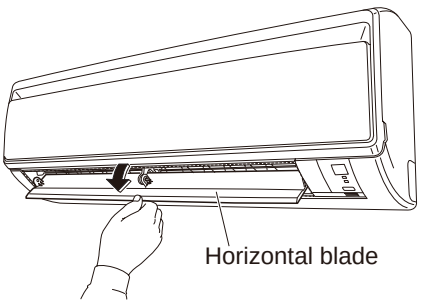
11. Removal Procedure

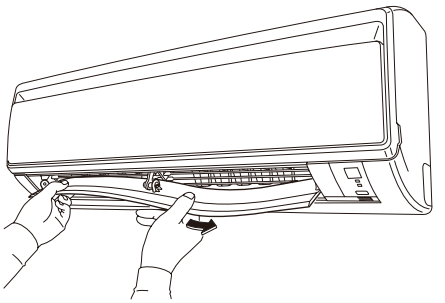
⚠ Caution: discharge the refrigerant completely before removal.

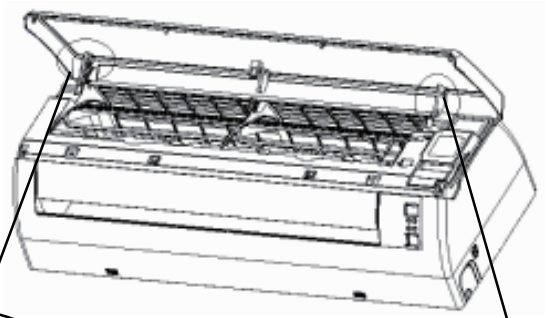
11.1 Removal Procedure of Indoor Unit

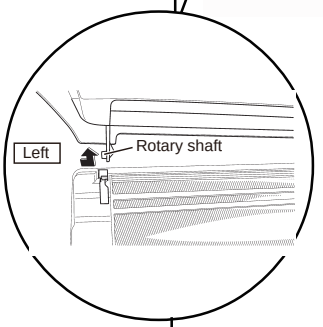
Steps	Procedure	Points
1. External features		■ If ON/OFF button is kept pushing for 5 seconds, aforced cooling operation willbe carried out for approx. 15minutes.
2. Removing air filters		
a Pull protrusions on left and right sides of panel with fingers and open front grille all the way.		
b Lift center section of air filter and disengage hooks.		■ Left and right filters are interchangeable. ■ To re-install, insert air filter along the guide.
c Remove air filter by pulling forward.		

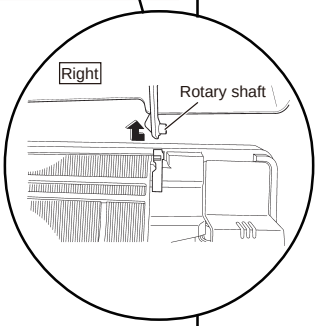
Steps	Procedure	Points
3. Remove panel		Support the front panel by one hand, while remove the rotation axis at the upper center by the other hand. ■ And pull out the front panel forward to remove.
a	Pull down horizontal blade by pulling forward.	
b	Remove horizontal blade by pulling forward.	
c	Hook a finger onto the projection part provided on the both sides of the unit's panel and open up the panel to the position higher than it will stop.	■ Left and right filters are interchangeable. ■ To re-install, insert air filter along the guide.
d	Remove the front panel from the unit.	

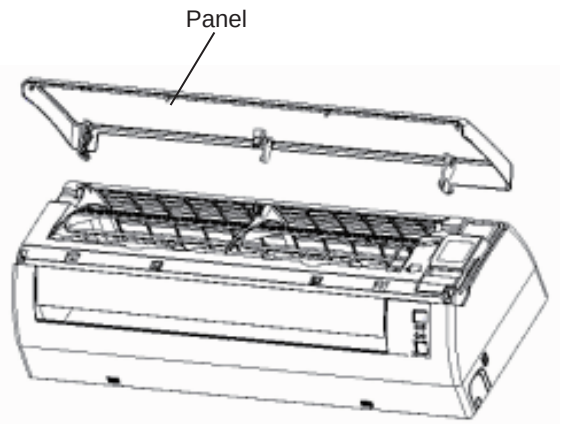


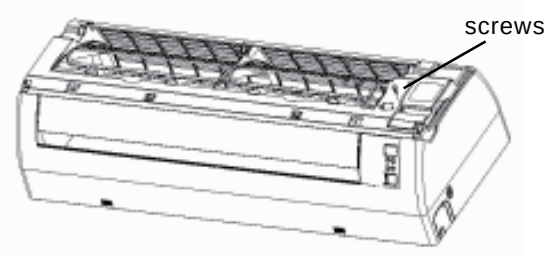
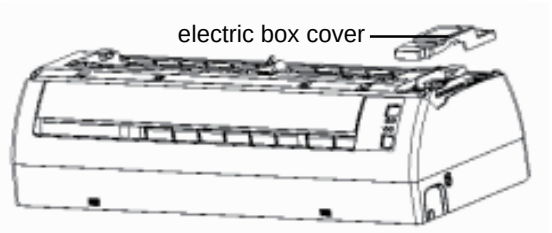
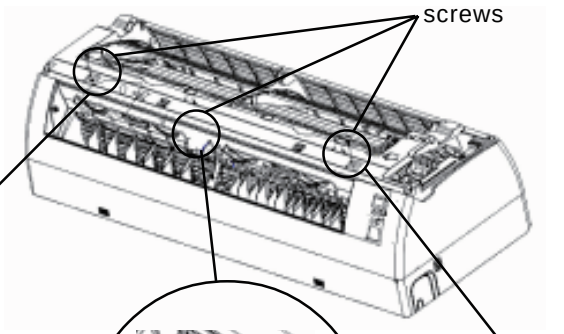
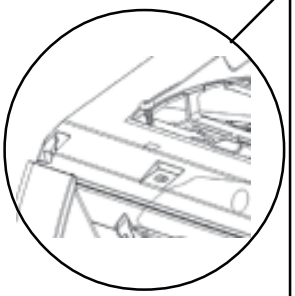
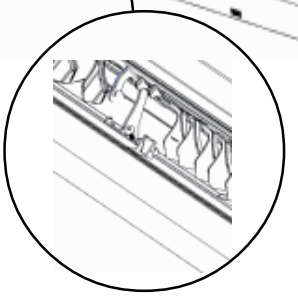
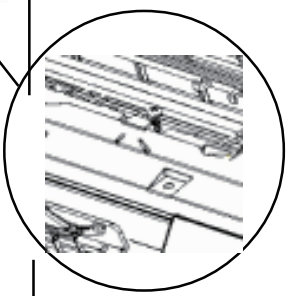
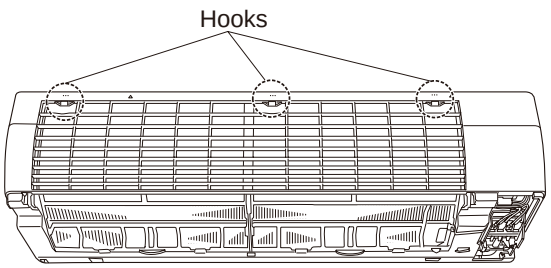
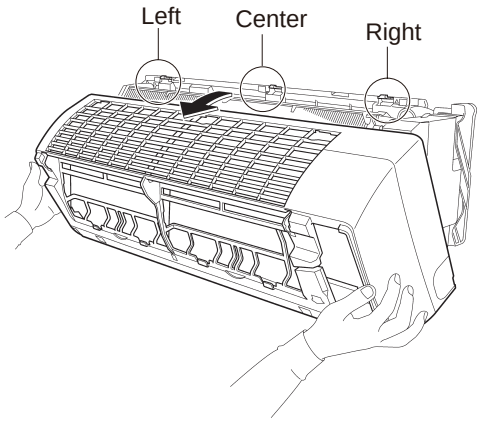




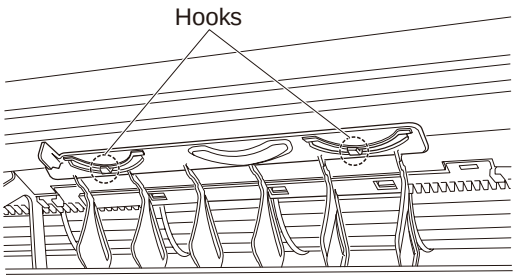


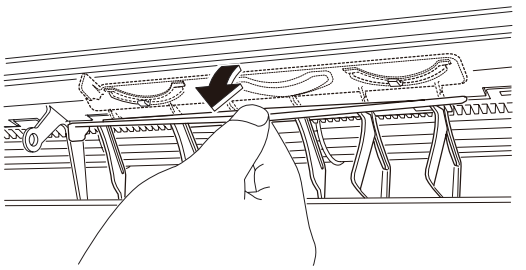


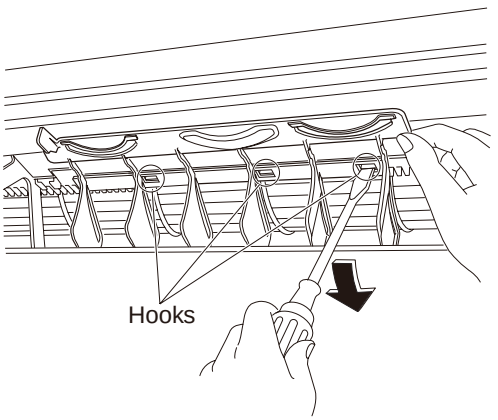


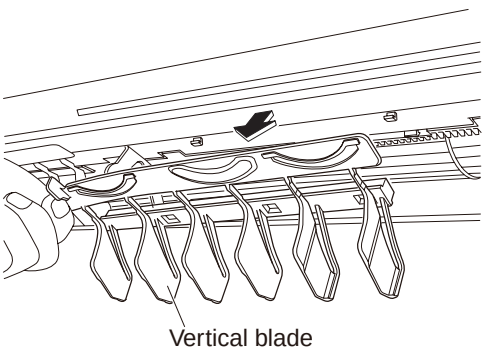
Steps	Procedure	Points
4. Remove electric box cover		
Remove a electric box cover mounting screw. Open electric box cover upward.		■ A switch for field setting is not provided in particular.
5. Remove front case		
a Remove the 3 screws, in the right and the left, which fix the main body with the front grille.	  	■ Screw stoppers inside the flap which were equipped in the existing models are not provided.
b Disengage the 3 hooks on the upper part. In case that the hooks are not pressed from above, remove the front panel and then remove the grille while pushing the hook through a clearance between the front grille and the heat exchanger.		■ At the upper part there are 2 hooks in the left and the right.
c The front grille can be removed in a manner to pull out the upper part forward and lift up the lower part.		■ Disengage the hooks by pressing knobs with a screwdriver.

Steps	Procedure	Points
6. Remove the vertical blade		
a	Unfasten the hooks at the upper 2 positions.	■ A set of vertical blade has 6 fins as on ASSY. (It is impossible to replace only one fin.) ■ The set of vertical blades is not marked for difference between right and left.
b	Unfasten the 3 hooks at the shaft mounting part by pressing them with a flat screwdriver.	■ Repeat the same procedure to remove the vertical blade on the other side.
c	Remove the vertical blade.	

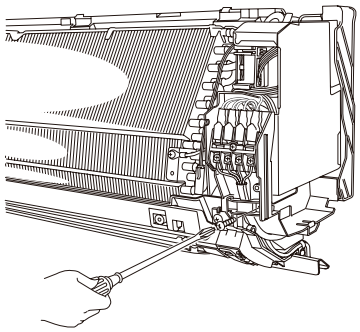


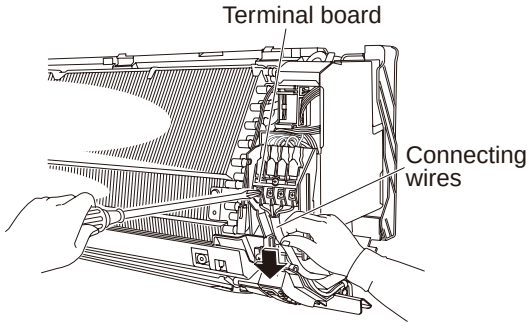


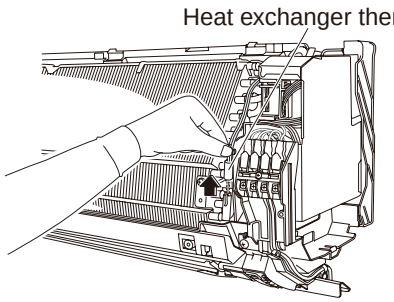


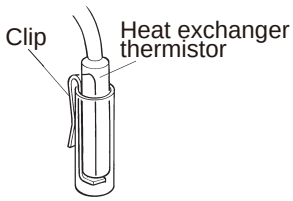


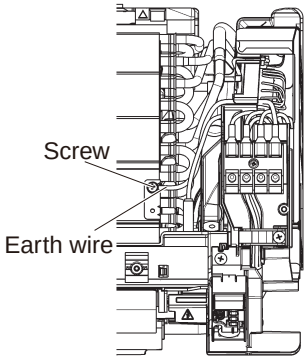
Steps	Procedure	Points
7. Remove electrical box		
a	Disconnect the cable clamp	■ Pay attention to the direction of the retainer of the thermistor so that the retainer will not touch the harness (same as the existing models.)
b	Disconnect the connection wires.	
c	Remove temperature sensor	■ Take care not to lose the clip of thermistor.
d	Remove a screw on the terminal board.	■ The electrical box can be removed instead of disengaging the terminal board.

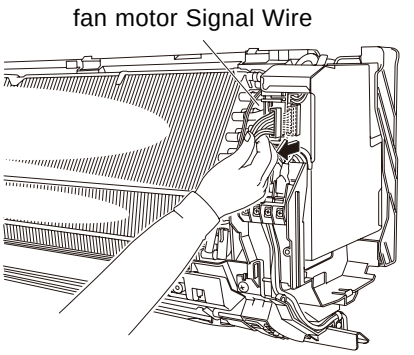
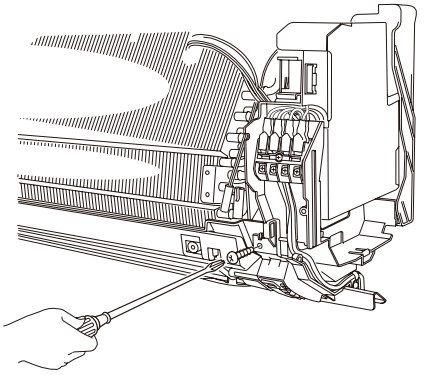
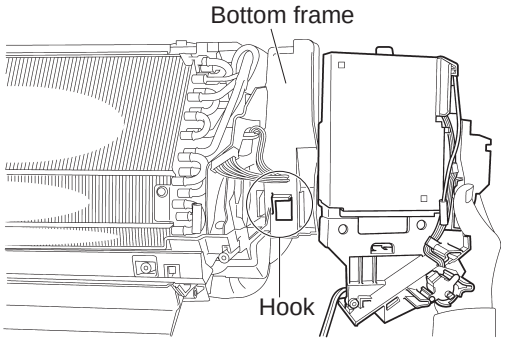


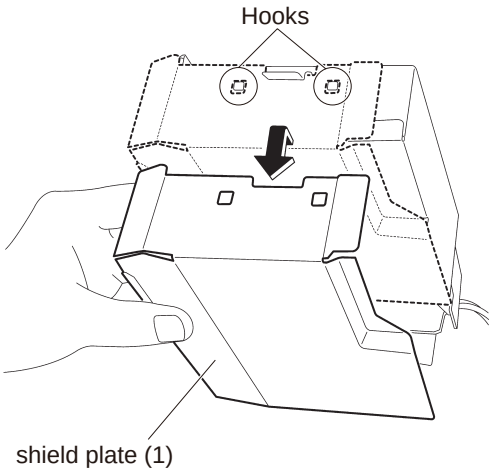
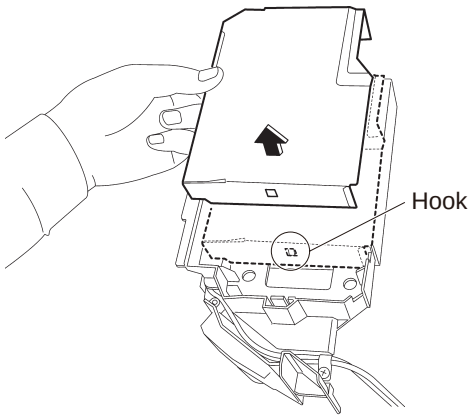
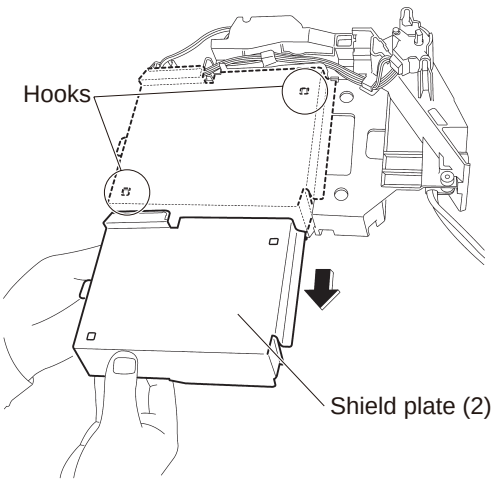


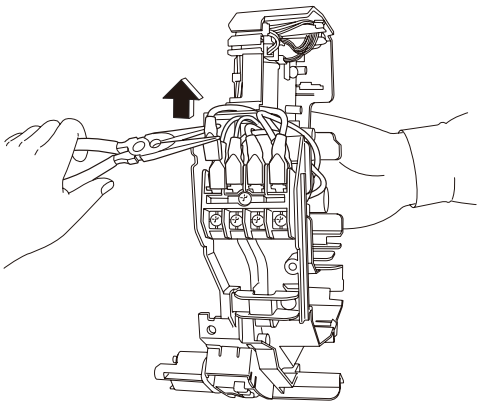
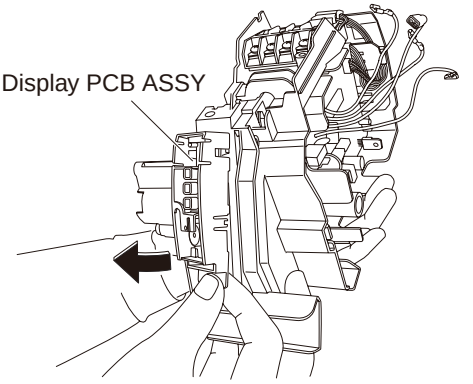
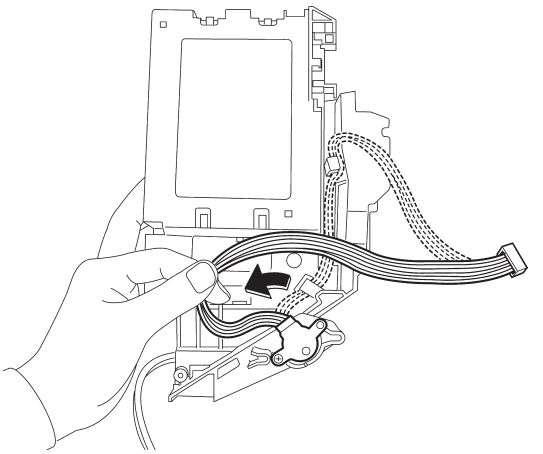
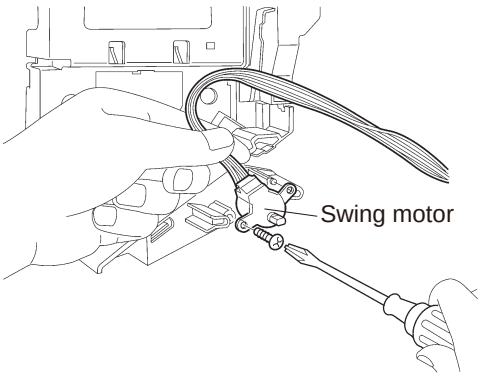


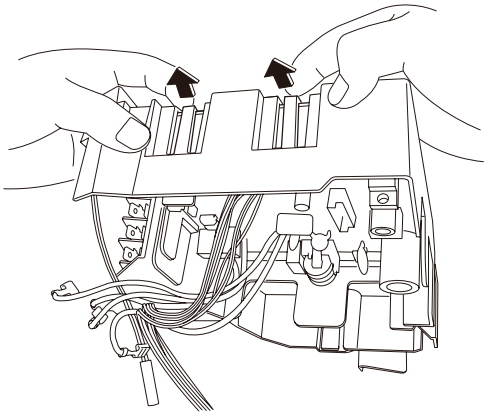
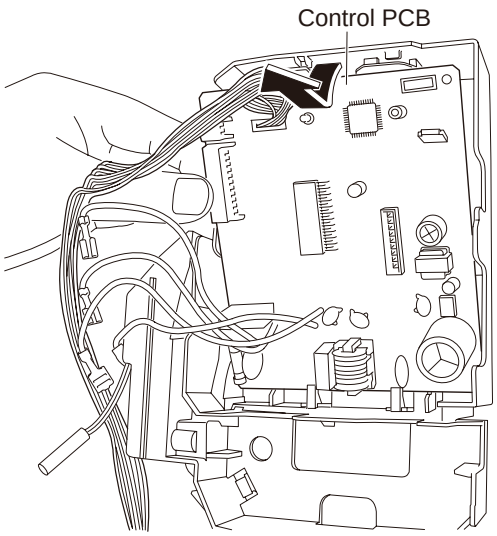


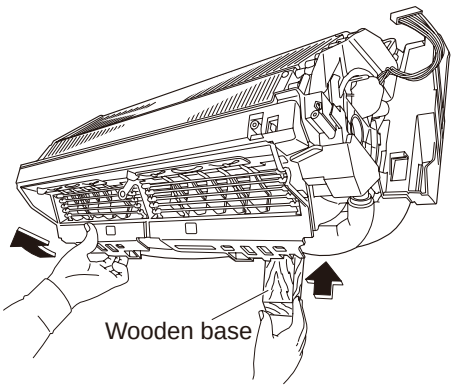
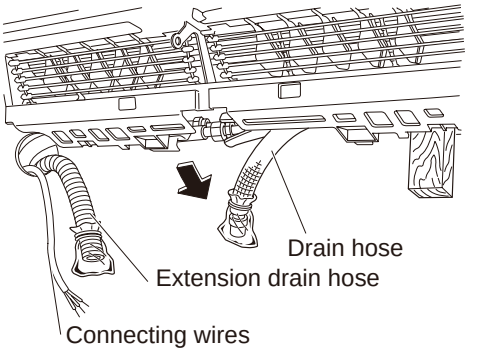
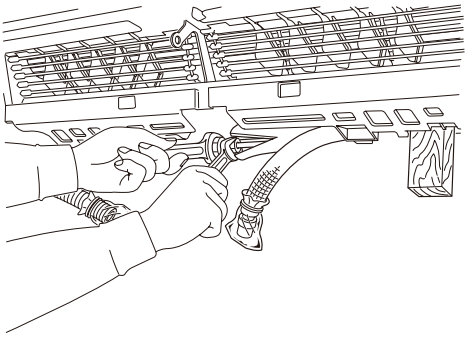
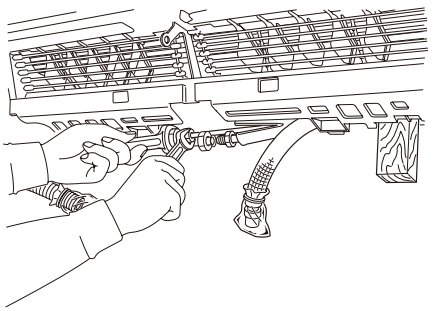


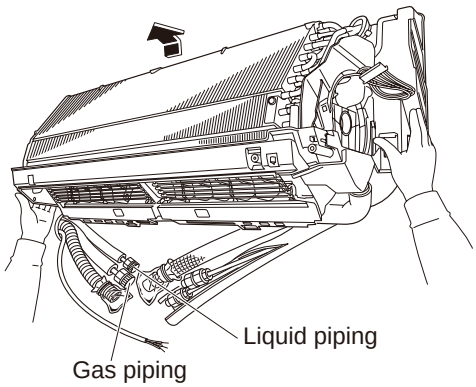
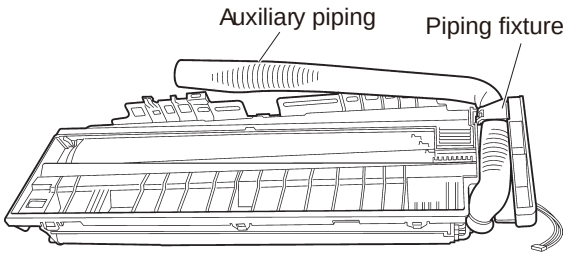
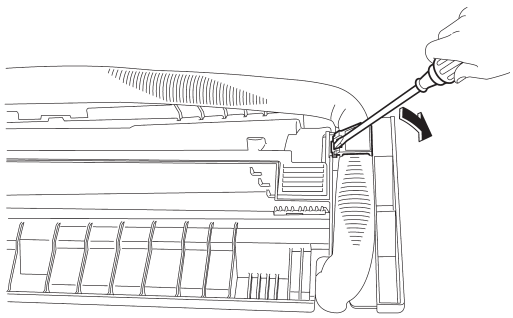
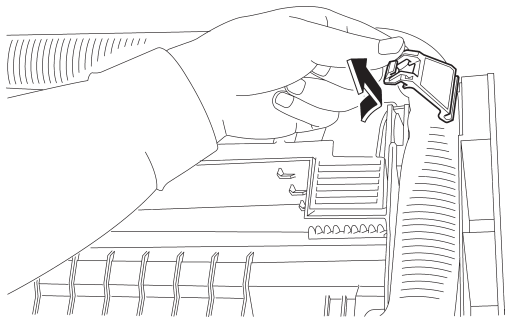
Steps	Procedure		Points
e	Remove fan motor Signal Wire		
f	Remove a screw on the electrical box.		
g	Pull up the electrical box forward to remove.		

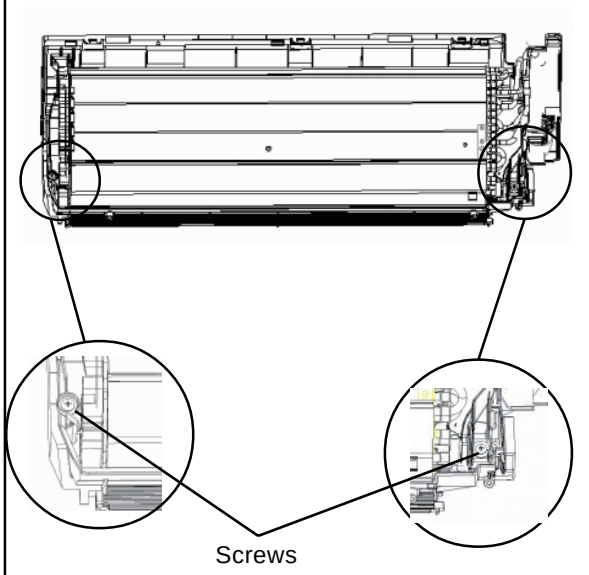
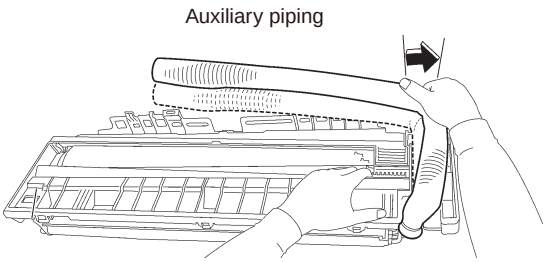
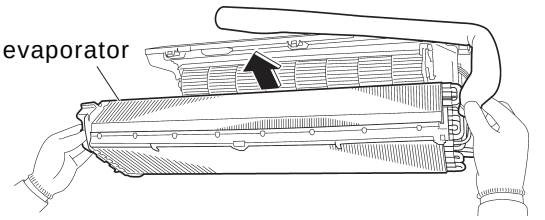
Steps		Procedure	Points
8. Remove the shield plate and control PCB			
a	Unfasten the hooks at the upper 2 positions of the shield plate.		■ Remove the electrical box according to the “Removal of Electrical Box”.
b	Unfasten the hook at the lower position, and remove the shield plate (1).		
c	Lift the shield plate (2) and unfasten the 2 hooks.		
d	Slide the shield plate (2) and remove it.		

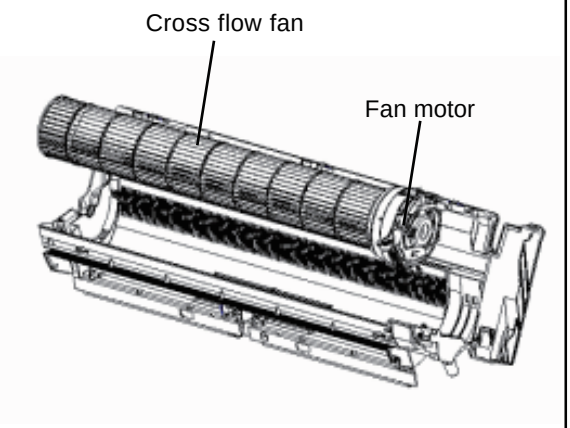
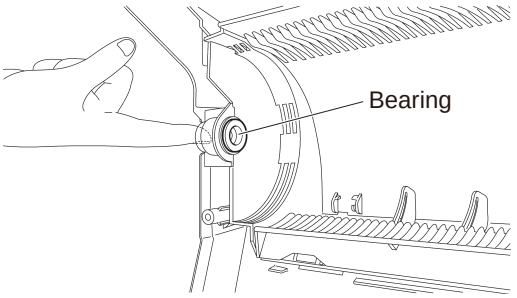
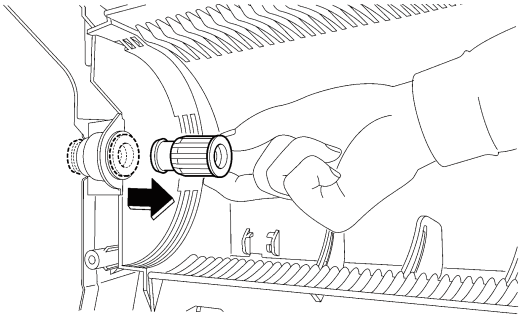
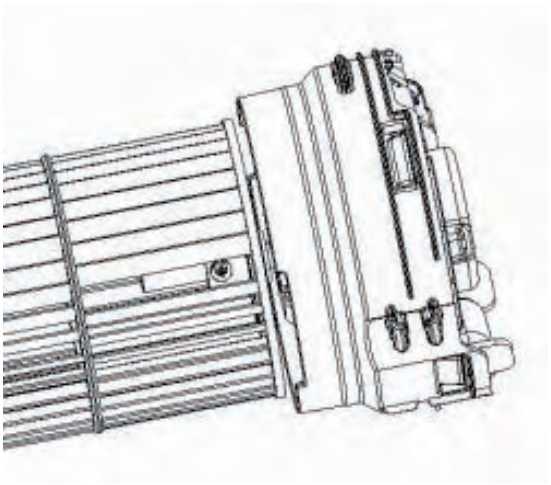
Steps	Procedure		Points
e	Take off wiring terminal		
f	Remove display PCB sub-Assy.		
g	Remove swing motor.	 	

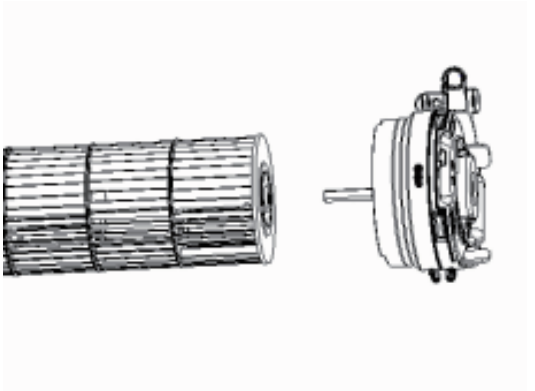
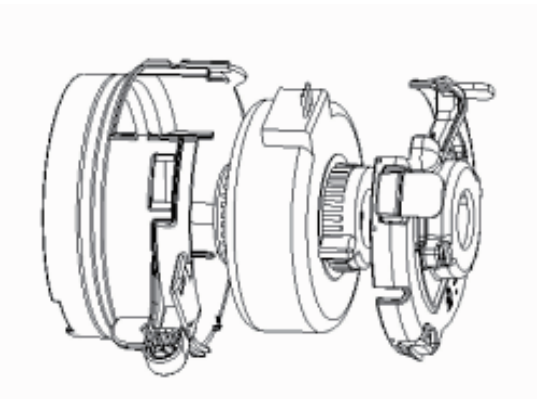
Steps	Procedure		Points
h	To remove the control PCB, unfasten the 2 hooks at the upper part from the rear side.		■ The control PCB is integrated with the power supply PCB.
i	Lift up the upper part of the control PCB, and remove it.		

Steps		Procedure	Points
9. Remove the refrigerant piping			
a	Lift the indoor unit by a wooden base.		⚠ CAUTION If gas leaks, repair the spot of leaking, then collect all refrigerant from the unit. After conducting vacuum drying, recharge proper amount of refrigerant. ⚠ CAUTION Do not contaminate any gas (including air) other than the specified refrigerant (R-410A) into refrigerant cycle. (Contaminating of air or other gas causes abnormal high pressure in refrigerating cycle, and this results in pipe breakage or personal injuries.)
b	Place a plastic sheet under the drain pan as remaining drain may leak.		■ Pay attention so that the residual water in the drain will not make the floor wet.
c	Disconnect the flare nut for gas piping by 2 wrenches.		■ In case that a drain hose is buried inside a wall, remove it after the drain hose in the wall is pulled out.
d	Disconnect the flare nut for liquid piping by 2 wrenches.		■ Use two wrenches to disconnected pipes. ■ When disconnecting pipes, cover every nozzle with caps so as not to let dust and moisture in.

Steps		Procedure	Points
10. Remove evaporator assy			
a	Remove the indoor unit from the installation plate.		■ When the pipings are disconnected, protect the both openings from entering moisture.
b	Release the hook of the piping fixture on the back of the unit.	  	

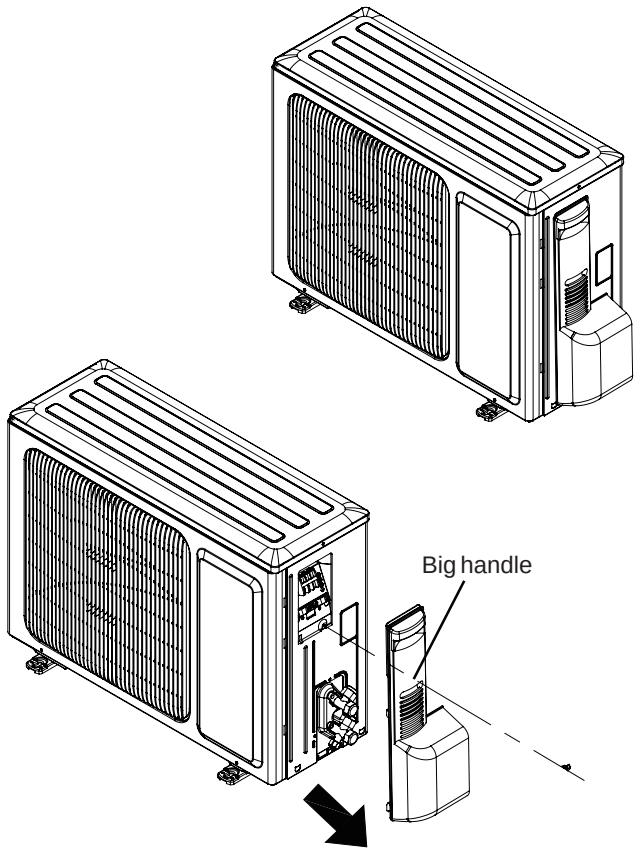
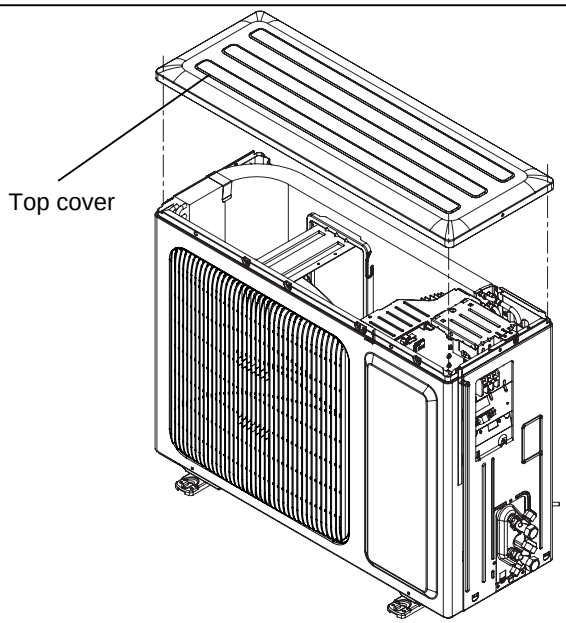
Steps	Procedure		Points
c	Loosen the 2 screws, in the right and the left, which fix the evaporator assy.		
d	Widen the auxiliary piping to the extent of 10°~20°.		
e	Pull the evaporator assy to the front side to undo the hooks completely, and then lift it.		

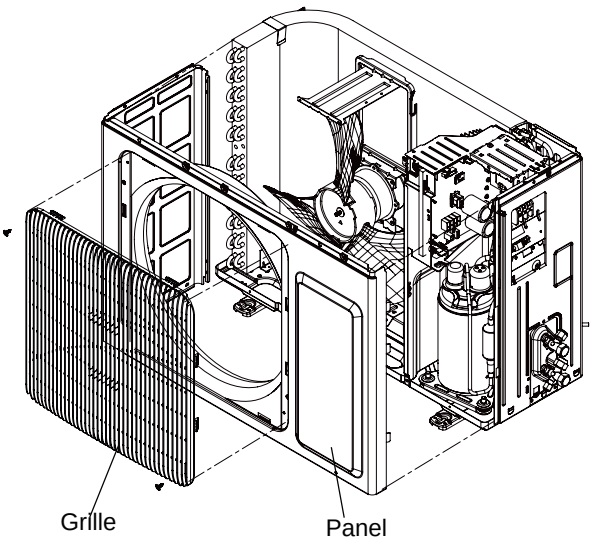
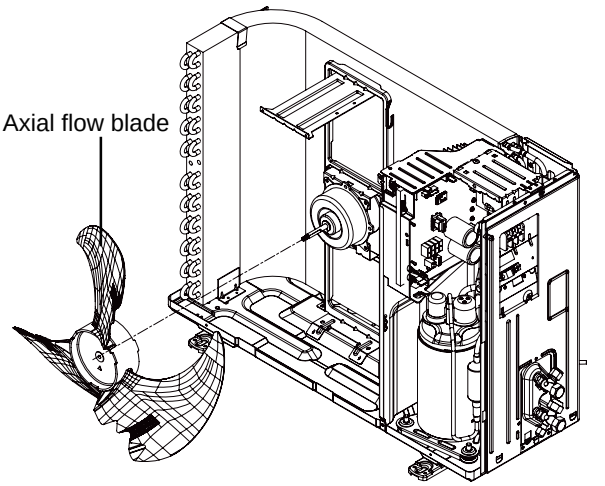
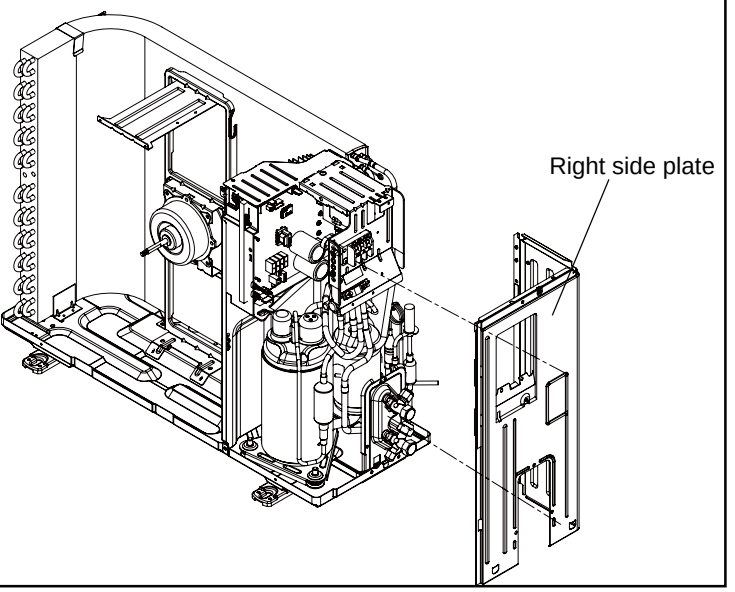
Steps	Procedure	Points
11. Remove cross flow fan and fan motor		
a	Remove cross flow fan and fan motor.	
b	Remove the rubber cushion of the bearing.	 
c	Remove the screws at the joint of the cross flow blade and the motor.	

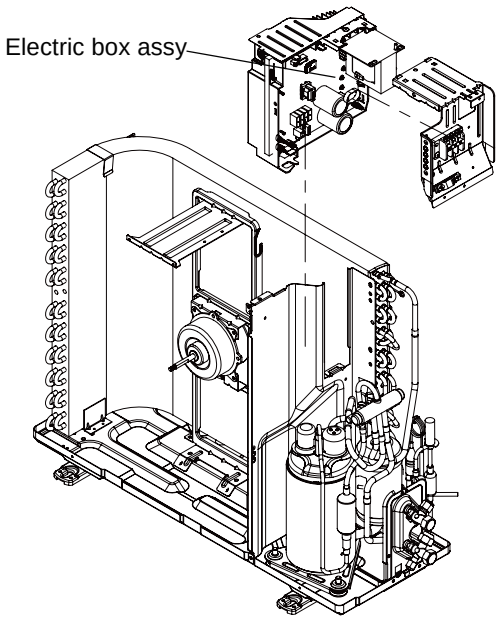
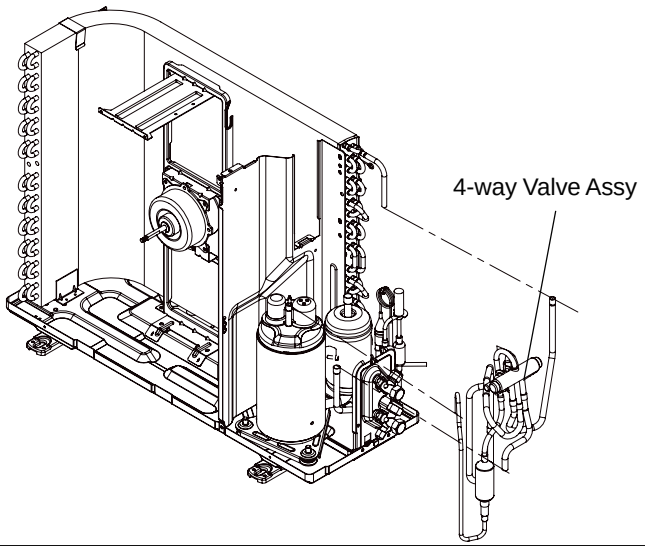
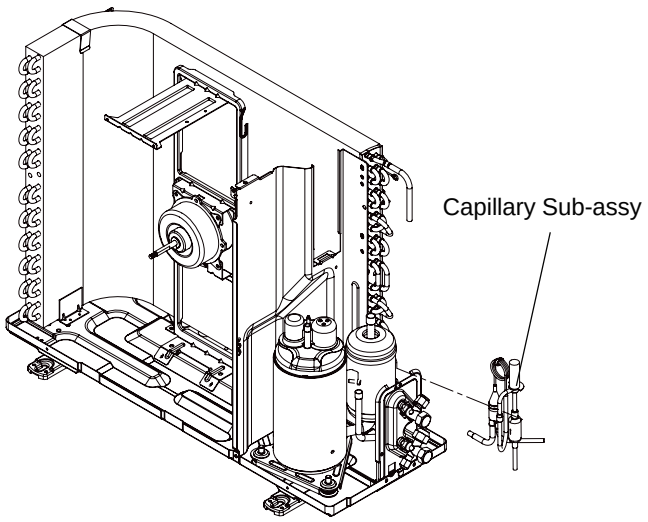
Steps	Procedure		Points
d	Take down the motor sub-assy.		
e	Remove fan motor.		

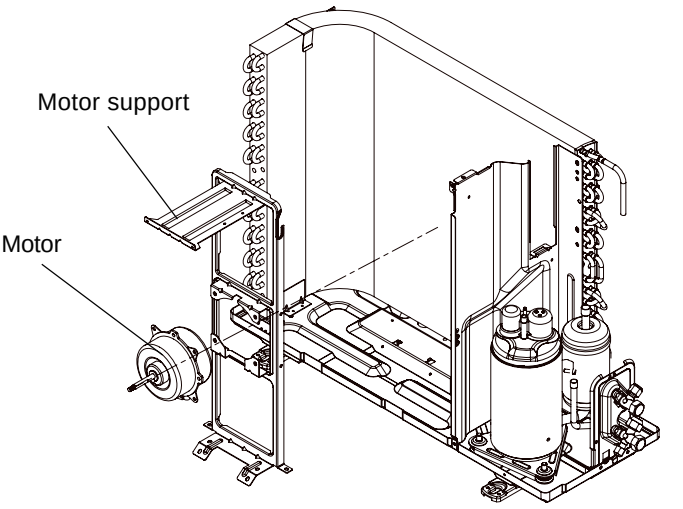
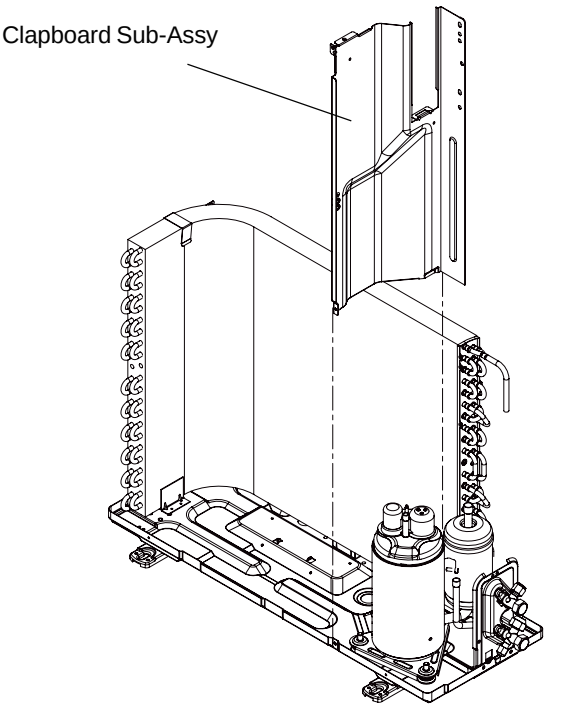
11.2 Removal Procedure of Outdoor Unit

Warning: Be sure to wait for a minimum of 20 minutes after turning off all power supplies and discharge the refrigerant completely before removal.

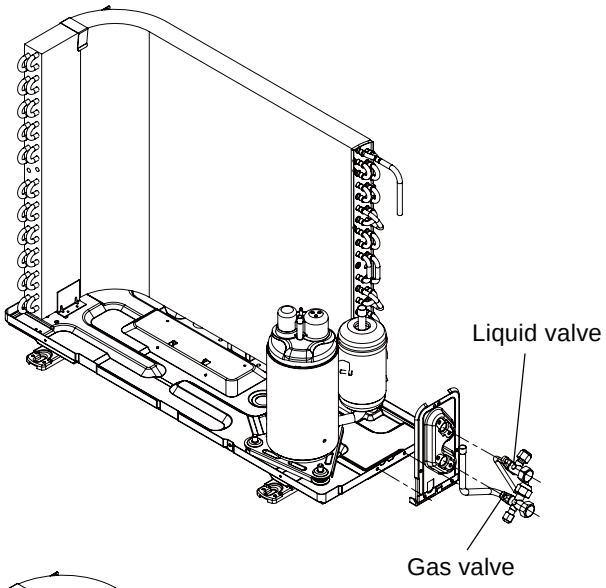
Steps	Procedure	
	1.Remove big handle	
	Before disassamble. Remove 1 connection screw fixing big handleand then removethe big handle.	
	2. Remove top cover	
	Remove 3 connection screws among top cover plate, front panel and right sideplate. Then remove top cover plate.	

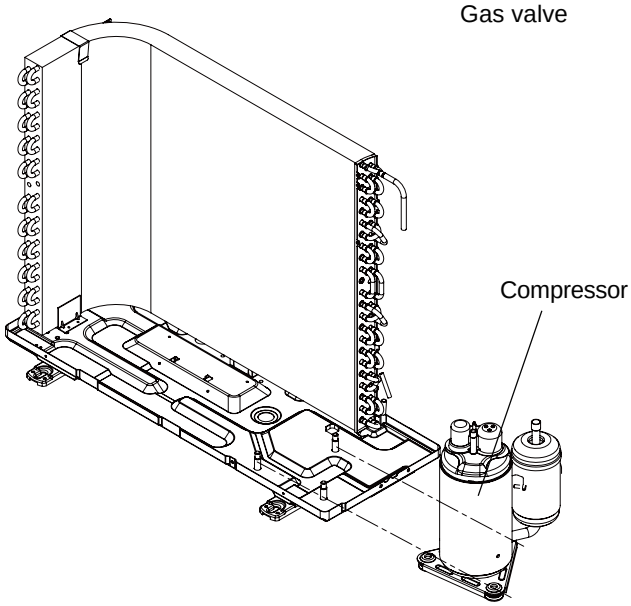
Steps	Procedure
3.Remove grille and front panel	
	Remove connection screws between the front grille and the front panel. Then remove the front grille. Remove connection screws connecting the front panel with the chassis and the motor support, and then remove the front panel.
	
4.Remove axial flow blade	
	Remove the nut fixing the blade and then remove the axial flow blade.
	
5.Remove right side plate	
	Remove connection screws connecting the right side plate with the valve support and the electric box. Then remove the right side plate.
	

Steps	Procedure
6.Remove electric box assy	
Remove the 2 screws fixing the cover of electric box. Lift to remove the cover. Loosen the wire and disconnect the terminal. Lift to remove the electric box assy.	
7.Remove 4-way valve assy	
Unscrew the fastening nut of the 4-way Valve Assy coil and remove the coil. Wrap the 4-way Valve Assy with wet cotton and unsolder the 4 weld spots connecting the 4-way Valve Assy to take it out.(Note: Refrigerant should be discharged firstly.) Welding process should be as quickly as possible and keep wrapping cotton wet all the time. Be sure not to burn out the lead-out wire of compressor.	
8.Remove capillary sub-assy	
Unsolder weld point of capillary Sub-assy, valve and outlet pipe of condensator. Then remove the capillary Sub-assy. Do not block the capillary when unsoldering it. (Note: before unsoldering,discharge refrigerants completely)	

Steps	Procedure
9.Remove motor and motor support	
	Remove the 4 tapping screws fixing the motor. Pull out the lead-out wire and remove the motor. Remove the 2 tapping screws fixing the motor support. Lift motor support to remove it.
	
10.Remove clapboard sub-assy	
	Loosen the screws of the Clapboard Sub-Assy . The Clapboard Sub-Assy has a hook on the lower side. Lift and pull the Clapboard Sub-Assy to remove.
	

Steps	Procedure
11.Remove Compressor	
a	Remove the 2 screws fixing the gas valve. Unsolder the welding spot connecting gas valve and air return pipe and remove the gas valve. (Note: it is necessary to warp the gas valve when unsoldering the welding spot.) Remove the 2 screws fixing liquid valve. Unsolder the welding spot connecting liquid valve and remove the liquid valve.
b	Remove the 3 footing screws of the compressor and remove the compressor.





Appendix:

Appendix 1: Reference Sheet of Celsius and Fahrenheit

Conversion formula for Fahrenheit degree and Celsius degree: Tf=Tcx1.8+32

Set temperature

Fahrenheit display temperature (°F)	Fahrenheit (°F)	Celsius(°C)	Fahrenheit display temperature (°F)	Fahrenheit (°F)	Celsius(°C)	Fahrenheit display temperature (°F)	Fahrenheit (°F)	Celsius(°C)
61	60.8	16	69/70	69.8	21	78/79	78.8	26
62/63	62.6	17	71/72	71.6	22	80/81	80.6	27
64/65	64.4	18	73/74	73.4	23	82/83	82.4	28
66/67	66.2	19	75/76	75.2	24	84/85	84.2	29
68	68	20	77	77	25	86	86	30

Ambient temperature

Fahrenheit display temperature (°F)	Fahrenheit (°F)	Celsius(°C)	Fahrenheit display temperature (°F)	Fahrenheit (°F)	Celsius(°C)	Fahrenheit display temperature (°F)	Fahrenheit (°F)	Celsius(°C)
32/33	32	0	55/56	55.4	13	79/80	78.8	26
34/35	33.8	1	57/58	57.2	14	81	80.6	27
36	35.6	2	59/60	59	15	82/83	82.4	28
37/38	37.4	3	61/62	60.8	16	84/85	84.2	29
39/40	39.2	4	63	62.6	17	86/87	86	30
41/42	41	5	64/65	64.4	18	88/89	87.8	31
43/44	42.8	6	66/67	66.2	19	90	89.6	32
45	44.6	7	68/69	68	20	91/92	91.4	33
46/47	46.4	8	70/71	69.8	21	93/94	93.2	34
48/49	48.2	9	72	71.6	22	95/96	95	35
50/51	50	10	73/74	73.4	23	97/98	96.8	36
52/53	51.8	11	75/76	75.2	24	99	98.6	37
54	53.6	12	77/78	77	25			

Appendix 2: Configuration of Connection Pipe

1.Standard length of connection pipe

● 5m, 7.5m, 8m.

2.Min. length of connection pipe is 3m.

3.Max. length of connection pipe and max. high difference.

4.The additional refrigerant oil and refrigerant charging required after prolonging connection pipe

● After the length of connection pipe is prolonged for 10m at the basis of standard length, you should add 5ml of refrigerant oil for each additional 5m of connection pipe.

● The calculation method of additional refrigerant charging amount (on the basis of liquid pipe):

Cooling capacity	Max length of connection pipe	Max height difference
5000 Btu/h(1465 W)	15 m	5 m
7000 Btu/h(2051 W)	15 m	5 m
9000 Btu/h(2637 W)	15 m	10 m
12000 Btu/h(3516 W)	20 m	10 m
18000 Btu/h(5274 W)	25 m	10 m
24000 Btu/h(7032 W)	25 m	10 m
28000 Btu/h(8204 W)	30 m	10 m
36000 Btu/h(10548 W)	30 m	20 m
42000 Btu/h(12306 W)	30 m	20 m
48000 Btu/h(14064 W)	30 m	20 m

● When the length of connection pipe is above 5m, add refrigerant according to the prolonged length of liquid pipe. The additional refrigerant charging amount per meter is different according to the diameter of liquid pipe. See the following sheet.

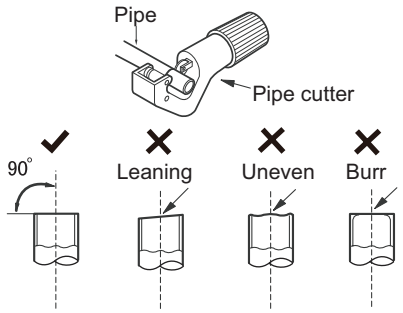
● Additional refrigerant charging amount = prolonged length of liquid pipe X additional refrigerant charging amount per meter

Additional refrigerant charging amount for R22, R407C, R410A and R134a			
Diameter of connection pipe		Outdoor unit throttle	
Liquid pipe(mm)	Gas pipe(mm)	Cooling only(g/m)	Cooling and heating(g/m)
Φ6	Φ9.5 or Φ12	15	20
Φ6 or Φ9.5	Φ16 or Φ19	15	20
Φ12	Φ19 or Φ22.2	30	120
Φ16	Φ25.4 or Φ31.8	60	120
Φ19	/	250	250
Φ22.2	/	350	350

Appendix 3: Pipe Expanding Method

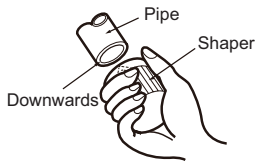
⚠ **Note:**

Improper pipe expanding is the main cause of refrigerant leakage.Please expand the pipe according to the following steps:



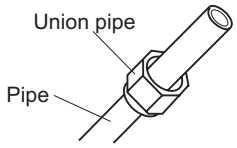
A:Cut the pip
- Confirm the pipe length according to the distance of indoor unit and outdoor unit.
- Cut the required pipe with pipe cutter.

B:Remove the burrs
- Remove the burrs with shaper and prevent the burrs from getting into the pipe.



C:Put on suitable insulating pipe

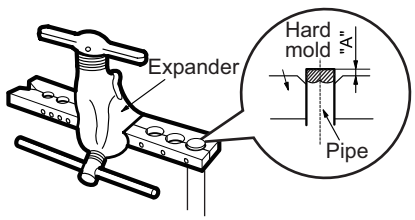
D:Put on the union nut
- Remove the union nut on the indoor connection pipe and outdoor valve; install the union nut on the pipe.



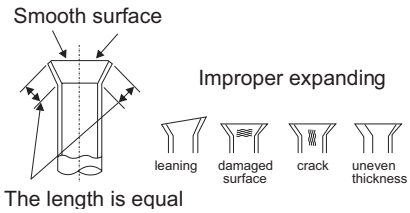
E:Expand the port
- Expand the port with expander.

⚠ **Note:**
- "A" is different according to the diameter, please refer to the sheet below:

Outer diameter(mm)	A(mm)	
	Max	Min
Φ6 - 6.35 (1/4")	1.3	0.7
Φ9.52 (3/8")	1.6	1.0
Φ12 - 12.70 (1/2")	1.8	1.0
Φ16 - 15.88 (5/8")	2.4	2.2



F:Inspection
- Check the quality of expanding port. If there is any blemish, expand the port again according to the steps above.



Appendix 4: List of Resistance for Temperature Sensor

Resistance Table of Ambient Temperature Sensor for Indoor and Outdoor (15K)

Temp(°C)	Resistance(kΩ)		Temp(°C)	Resistance(kΩ)		Temp(°C)	Resistance(kΩ)		Temp(°C)	Resistance(kΩ)
-19	138.1		20	18.75		59	3.848		98	1.071
-18	128.6		21	17.93		60	3.711		99	1.039
-17	121.6		22	17.14		61	3.579		100	1.009
-16	115		23	16.39		62	3.454		101	0.98
-15	108.7		24	15.68		63	3.333		102	0.952
-14	102.9		25	15		64	3.217		103	0.925
-13	97.4		26	14.36		65	3.105		104	0.898
-12	92.22		27	13.74		66	2.998		105	0.873
-11	87.35		28	13.16		67	2.896		106	0.848
-10	82.75		29	12.6		68	2.797		107	0.825
-9	78.43		30	12.07		69	2.702		108	0.802
-8	74.35		31	11.57		70	2.611		109	0.779
-7	70.5		32	11.09		71	2.523		110	0.758
-6	66.88		33	10.63		72	2.439		111	0.737
-5	63.46		34	10.2		73	2.358		112	0.717
-4	60.23		35	9.779		74	2.28		113	0.697
-3	57.18		36	9.382		75	2.206		114	0.678
-2	54.31		37	9.003		76	2.133		115	0.66
-1	51.59		38	8.642		77	2.064		116	0.642
0	49.02		39	8.297		78	1.997		117	0.625
1	46.6		40	7.967		79	1.933		118	0.608
2	44.31		41	7.653		80	1.871		119	0.592
3	42.14		42	7.352		81	1.811		120	0.577
4	40.09		43	7.065		82	1.754		121	0.561
5	38.15		44	6.791		83	1.699		122	0.547
6	36.32		45	6.529		84	1.645		123	0.532
7	34.58		46	6.278		85	1.594		124	0.519
8	32.94		47	6.038		86	1.544		125	0.505
9	31.38		48	5.809		87	1.497		126	0.492
10	29.9		49	5.589		88	1.451		127	0.48
11	28.51		50	5.379		89	1.408		128	0.467
12	27.18		51	5.197		90	1.363		129	0.456
13	25.92		52	4.986		91	1.322		130	0.444
14	24.73		53	4.802		92	1.282		131	0.433
15	23.6		54	4.625		93	1.244		132	0.422
16	22.53		55	4.456		94	1.207		133	0.412
17	21.51		56	4.294		95	1.171		134	0.401
18	20.54		57	4.139		96	1.136		135	0.391
19	19.63		58	3.99		97	1.103		136	0.382

Resistance Table of Tube Temperature Sensors for Indoor and Outdoor (20K)

Temp(°C)	Resistance(kΩ)		Temp(°C)	Resistance(kΩ)		Temp(°C)	Resistance(kΩ)		Temp(°C)	Resistance(kΩ)
-19	181.4		20	25.01		59	5.13		98	1.427
-18	171.4		21	23.9		60	4.948		99	1.386
-17	162.1		22	22.85		61	4.773		100	1.346
-16	153.3		23	21.85		62	4.605		101	1.307
-15	145		24	20.9		63	4.443		102	1.269
-14	137.2		25	20		64	4.289		103	1.233
-13	129.9		26	19.14		65	4.14		104	1.198
-12	123		27	18.13		66	3.998		105	1.164
-11	116.5		28	17.55		67	3.861		106	1.131
-10	110.3		29	16.8		68	3.729		107	1.099
-9	104.6		30	16.1		69	3.603		108	1.069
-8	99.13		31	15.43		70	3.481		109	1.039
-7	94		32	14.79		71	3.364		110	1.01
-6	89.17		33	14.18		72	3.252		111	0.983
-5	84.61		34	13.59		73	3.144		112	0.956
-4	80.31		35	13.04		74	3.04		113	0.93
-3	76.24		36	12.51		75	2.94		114	0.904
-2	72.41		37	12		76	2.844		115	0.88
-1	68.79		38	11.52		77	2.752		116	0.856
0	65.37		39	11.06		78	2.663		117	0.833
1	62.13		40	10.62		79	2.577		118	0.811
2	59.08		41	10.2		80	2.495		119	0.77
3	56.19		42	9.803		81	2.415		120	0.769
4	53.46		43	9.42		82	2.339		121	0.746
5	50.87		44	9.054		83	2.265		122	0.729
6	48.42		45	8.705		84	2.194		123	0.71
7	46.11		46	8.37		85	2.125		124	0.692
8	43.92		47	8.051		86	2.059		125	0.674
9	41.84		48	7.745		87	1.996		126	0.658
10	39.87		49	7.453		88	1.934		127	0.64
11	38.01		50	7.173		89	1.875		128	0.623
12	36.24		51	6.905		90	1.818		129	0.607
13	34.57		52	6.648		91	1.736		130	0.592
14	32.98		53	6.403		92	1.71		131	0.577
15	31.47		54	6.167		93	1.658		132	0.563
16	30.04		55	5.942		94	1.609		133	0.549
17	28.68		56	5.726		95	1.561		134	0.535
18	27.39		57	5.519		96	1.515		135	0.521
19	26.17		58	5.32		97	1.47		136	0.509

Resistance Table of Discharge Temperature Sensor for Outdoor (50K)

Temp(°C)	Resistance(kΩ)		Temp(°C)	Resistance(kΩ)		Temp(°C)	Resistance(kΩ)		Temp(°C)	Resistance(kΩ)
-29	853.5		10	98		49	18.34		88	4.75
-28	799.8		11	93.42		50	17.65		89	4.61
-27	750		12	89.07		51	16.99		90	4.47
-26	703.8		13	84.95		52	16.36		91	4.33
-25	660.8		14	81.05		53	15.75		92	4.20
-24	620.8		15	77.35		54	15.17		93	4.08
-23	580.6		16	73.83		55	14.62		94	3.96
-22	548.9		17	70.5		56	14.09		95	3.84
-21	516.6		18	67.34		57	13.58		96	3.73
-20	486.5		19	64.33		58	13.09		97	3.62
-19	458.3		20	61.48		59	12.62		98	3.51
-18	432		21	58.77		60	12.17		99	3.41
-17	407.4		22	56.19		61	11.74		100	3.32
-16	384.5		23	53.74		62	11.32		101	3.22
-15	362.9		24	51.41		63	10.93		102	3.13
-14	342.8		25	49.19		64	10.54		103	3.04
-13	323.9		26	47.08		65	10.18		104	2.96
-12	306.2		27	45.07		66	9.83		105	2.87
-11	289.6		28	43.16		67	9.49		106	2.79
-10	274		29	41.34		68	9.17		107	2.72
-9	259.3		30	39.61		69	8.85		108	2.64
-8	245.6		31	37.96		70	8.56		109	2.57
-7	232.6		32	36.38		71	8.27		110	2.50
-6	220.5		33	34.88		72	7.99		111	2.43
-5	209		34	33.45		73	7.73		112	2.37
-4	198.3		35	32.09		74	7.47		113	2.30
-3	199.1		36	30.79		75	7.22		114	2.24
-2	178.5		37	29.54		76	7.00		115	2.18
-1	169.5		38	28.36		77	6.76		116	2.12
0	161		39	27.23		78	6.54		117	2.07
1	153		40	26.15		79	6.33		118	2.02
2	145.4		41	25.11		80	6.13		119	1.96
3	138.3		42	24.13		81	5.93		120	1.91
4	131.5		43	23.19		82	5.75		121	1.86
5	125.1		44	22.29		83	5.57		122	1.82
6	119.1		45	21.43		84	5.39		123	1.77
7	113.4		46	20.6		85	5.22		124	1.73
8	108		47	19.81		86	5.06		125	1.68
9	102.8		48	19.06		87	4.90		126	1.64